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HEATING AND VENTILATING.

THERE can be little doubt that man's command over fire as a means of regulating the temperature of his surroundings has been of the utmost importance to his development as a reasoning if not always a reasonable being. Polar explorers have noted the benumbing effect of cold, not only upon the human circulation, but upon the powers of observation and of judgment; only the most exceptional men enjoy such robust constitutions as will enable them to combat the physical loss of energy due to inclement conditions and at the same time to attend to the multitudinous calls of civilised existence. The hardy aboriginal inhabitants of Tierra de Fuego may be capable of allowing falling snow to melt upon their unprotected bodies, but this enormous power of bodily resistance (if travellers can be believed) is only attained by the sacrifice of all the graces of life and of the mental outlook that appreciates them and calls them into being. But if the extreme south of America contains some of the forms of human life which endure adverse climatic conditions in very much the same manner as they are faced by the non-human vertebrates, the United States includes among its inhabitants people who are so used to the civilised appliances of central heating that a cold day in a house unprovided with an installation occasions them very real distress. American tourists spending the winter in the South of Europe have either to frequent hotels, where steam heating is provided, or breakfast in their wraps. Weather which seems merely bracing to an average Englishman fills them with positive discomfort and alarm, and though some of their complaints may be put down to a desire to suggest by inference the superior conditions of the land they have left, their horror of open windows, at least, is genuine. The winter climate of New York is reputed to be so severe as to render central heated buildings almost a necessity of civilised existence, and it would be futile to condemn a necessary provision against climatic conditions because its secondary effects are not altogether in accordance with English ideas of physical fitness in the individual. The American glories in his system, and can and does argue in its favour that the interior of his whole house is kept at the temperature he desires throughout the winter; that he can wear light clothes and sit in any part of any room in it, and only requires additional wraps on leaving it. English residents in America are not unanimous in finding fault with this arrangement, and those who profess they were smothered to death in American houses are giving a palpably exaggerated account of their experiences.

There seems to be a very general agreement among Englishmen that Americans like their houses "too hot and too stuffy," and among Americans that the English live in houses that are "terribly cold and draughty," where one is "half roasted and half frozen at the same time." Whatever system of heating and ventilating may be employed, it seems that persons unaccustomed to it will probably be inconvenienced by it, at all events for a while. Few opportunities can be provided for reasoned judgment as to the benefits of different systems, for a full experience of each might involve a stay of a whole season in different houses where different systems were in use. Climate, aspect, the exposure of the building, its purpose, come under consideration, as well as the habits of the occupants, who have their own preferences for certain temperatures.

Modern forms of central heating which allow of the exercise of separate control in separate rooms are necessary for any real degree of comfort, and the installation must be efficient in the performance of its functions, safe, quiet, and simple to control. No method of heating and ventilating modern buildings can claim the advantage of being fool-proof in working. Accidents happen even with old-fashioned open fires and open windows, and an installation tended, or left untended, by an ignorant or drunken employee may produce results that at the best are decidedly unpleasant, and at the worst may involve a tragedy. The minor vexation of water-hammer in pipes may pass almost unnoticed in the day time among a houseful of cheerful people, but becomes a torture to a sleepless and lonely person at night. Will the thumping clatter result in a burst pipe and the escape of scalding water or steam? The helplessness of the average householder in the face of technical matters very greatly increases his or her anxiety. "Which tap must I turn?" and "Which way must I turn it?" become riddles, whose solution involves the utmost difficulty when the heating engineer is away on leave, and an escape of steam demonstrates that something abnormal is occurring which may be the prelude to something dangerous happening in the course of a few minutes. Cases are known where women in remote country houses have been called upon to rescue carpets and pictures, and mop up and dispose of hot leakage water for hours together for lack of simple instructions in the management of heating apparatus, and although this is a reflection on human judgment, and not upon the efficiency of the installation, the two things have to be considered together by an architect asked to advise on the possibilities of central heating in such cases. Unless he happens to know that his client and his client's womenfolk are competent to keep their heads in minor emergencies, he will probably consider that experiments with new inventions must be made with care.

Complex systems of combined heating and ventilation, in which artificially heated or cooled air is delivered into a building by means of an elaboration of ducts and exhausts, imply an expert staff to manage the apparatus. But even where this condition is met the results are not always satisfactory, for there is always the possibility that the building will be used by a number of people who will remain in it long enough to realise that its quality of atmosphere is not what they are used to, but not long enough to get used to it. In the case of concert halls and theatres this objection is discounted in advance, for the audience would have to suffer some slight inconvenience in any case, and are prepared to suffer it in the interests of art. A theatre heated on modern lines is generally a great improvement on a theatre ventilated by the natural system, which sometimes involves complete vitiation of the atmosphere at the end of the play. It is a very difficult matter to ensure that every part of a theatre will be supplied with fresh air at a reasonable temperature at the same time. While the gallery may be comfortably warm, the stalls may be so decidedly frigid that instead of enjoying the spectacle stall-holders may be wondering how the performers manage to keep alive in the scanty clothing allotted in so many scenes in up-to-date comedy. There is something wrong in the management of the apparatus if the audience, in spite of the tropical scenery of any popular pseudo-oriental production, is shivering in its shoes and thinking regretfully of the overcoat handed in at the cloak room. Nearly all the difficulties encountered in theatre ventilation present themselves in the treatment of law courts, the atmospheric state of which arouses continual criticism. This is, perhaps, only to be expected. Instead of a good-tempered audience, the court is occupied by business men in a high state of nervous tension, and faults that might be overlooked in the theatre under the stimulus of amusement, or admiration, loom large and oppressive to folks already labouring under stress of anxiety, and whose presence in the court may be contrary to their own wishes. Some of the most successful examples of combined heating and ventilation are found in modern factory and large office buildings, where hot water or low-pressure steam radiators have been used in conjunction with fresh air inlet gratings beneath the windows. Granted a sufficiently large floor space and cubic capacity to reduce the inconvenience of draughts to a minimum, this method has been found acceptable in a great number of cases. The ability to open a window for oneself counts for a great deal with Englishmen, and systems which involve his obedience to the rules of the engineer as to whether a window may be opened, should only be employed where simpler methods are demonstrably inadequate to meet the special difficulties of the case.

NOTES.

Speculative Housing.

IN our leading article last week we emphasised a point which has frequently been made in our columns, that the architect should have more to do with designing small houses and in laying out housing schemes. We suggested that some special arrangement must be made between the architect and builder if this is to be brought about, and that a conference should be arranged by the Royal Institute of British Architects to discuss the situation from the points of view of the two parties mainly concerned. We are not without hope that the Institute will take some steps to arrange such a conference, the desire for which, we believe, is widespread, though a correspondent writes to say he should prefer a select committee, "as the R.I.B.A. would be too academical, whereas breadth and practical knowledge are essential, though, of course, architects would be represented, and probably be in the majority." For all that, we think the R.I.B.A. is a body which is eminently suitable to deal with the question—if it takes action without delay.

An Opportunity at Brighton.

Now that the proposed motor coach station on the Aquarium site at Brighton has been abandoned, has not the time arrived for the Corporation to organise an architectural competition for a great scheme of present and future development of the front? Such a scheme would include gardens, concert and dance halls, &c., to be taken in hand as the opportunity occurred. The advantages of these developments to Brighton would be considerable. It is stated that at a future meeting of the Corporation Councillor Aldrich is to move that the Borough Surveyor be instructed to prepare schemes for the development of the front, but surely a work of this magnitude and importance should be the outcome of a competition amongst architects? Undoubtedly, such a competition would produce schemes worthy of Brighton, especially if adequate premiums were offered. Only on September 15 we illustrated Ramsgate's solution of its lay-out and front development, which was the result of a competition.

The Secrets of the Best Architecture.

Is it fair to describe the present age as one in which "the secrets of the best architecture appear to be irrecoverable," as a daily paper says? Do modern architects acquiesce in such a view, or is it only possible for pessimistic old ladies? What are "the secrets of the best architecture"? To answer this it might be advisable to define what we mean by "the best." If by the best we mean that which answers practical uses in a comely and beautiful way we may be inclined to think some modern buildings are equal to the test. In regard to the comforts and conveniences of life expressed in an harmonious and pleasing way, is there anything which could bar the claim of a modern English country home to a place amongst the best architecture? We must admit, of course, that the impulse and ideal which brought about the fine Gothic churches of the Middle Ages are lacking to-day, but something has taken their place which makes possible the creation of a really fine Gothic structure. We are still living in an age of exaggerated sentiment which comes between the architect and his opportunities and talents, and perhaps it really would be a good thing if all our old buildings and furniture could be stowed away out of sight and forgotten for a time!

Higher Buildings for London.

WE have heard a great deal of argument recently in favour of increasing the height of buildings in London and other cities, but with the exception of one or two well-known architects we do not think professional opinion has indicated much sympathy with the proposals made. In fact, after the discussion and vote on the subject at the R.I.B.A. last year we may conclude that the view of the profession as a whole is that any general increase in the height of buildings would be detrimental to the amenities of London, and that the powers possessed by the L.C.C. for permitting an increase of height in particular cases are adequate. During the discussion last year Professor Beresford Pite made a pertinent observation, which is recalled to our mind by some observations on the subject made by Lord Shaw of Dunfermline in a recent article in *The Times* on "The New America." "With multitudes of men," said Professor Pite, "the street cannot afford permission to building owners to diminish the sky area above their heads by reducing more of our thoroughfares and alleys to valleys of shadow. An immense army of men and women clerks and workers, and of unhappy denizens of the back rooms of

A Sketch in Chiddingstone Village.
From a water-colour by MR. A. MAXWELL ALLEN.

flats, who are voiceless, have to be both warned and protected."

The American Skyscraper.

LORD SHAW OF DUNFERMLINE, in the article referred to, may be taken as an impartial observer, and this is his comment on the skyscraper: "New York is by itself. It represents cosmopolitanism in congestion. The skyscrapers which art, with a hesitating hand, is beginning to touch, here alleviating baldness of outline, and there throwing an occasional ornament of façade over a precipitous blank, signify much—the energy and daring that designed and constructed them, the enterprise and love of gain that demanded them just there and on these plots of ground, and that defiant heedlessness of the future by thus turning transport from ease and convenience into scuffle and deadlock. This future has come soon. Already, for instance, at the close of business hours, each of these reservoirs, twenty to fifty stories high, pours its living tide on to streets unable to contain the human avalanche, and standing room in any sort of transport can be reached only by a muscular triumph. London's transport problem is hard and difficult; but it is child's play to this. What disarrangement is here! For this has happened in a land where there is so much of God's earth to spare. Perhaps the time is at hand when the tenement village, at appointed hours, will assemble on the roof and take its flight from the city through the air! Unless this relief comes, the system is doomed—done to death by its own success. Or perhaps the scraper will go out of vogue when men begin to realise again that cities should be places to dwell in and not to dwell out of." Can we say that Lord Shaw overstresses the facts or that London would be free from similar perils if we permitted any substantial increase in the height of our City buildings?

English and American Garden Plots.

LORD SHAW has, further, some very interesting things to say in reference to the impressions formed by him while in America on the difference between our own domestic life and the more open and unenclosed freedom of America. The open fronts to their houses, the garden plots of each not enclosed like ours, front, one after the other, the roadway without fencing. This love of enclosing, though we think it is breaking down, is a remarkable trait in the English character. Look down any road containing, say, a hundred houses; each of them is seen enclosed by dividing walls or fences, kept up at some expense and often looking very unsightly. How much more charming, and economical at the same time, would it be to see such fronts united and left open to the road, laid out architecturally as a whole, instead of all this enclosing which darkens every garden. How pleasant to the eye would appear the long vista of green as we looked up and down the street, how much more airy and human! As Lord Shaw remarks: "All over the United States this excellent un-Englishness appears; yet but a little within the Canadian border the fence and the exclusiveness again appear."

Gate at Stoneleigh Abbey, Kenilworth.

Why Atelier?

THE formation of an architectural Atelier in connection with the University of London is a happy sign of the growing recognition of architecture, but why should details of the curriculum of modern architectural training always be given foreign names? The affectation of speaking of "atelier" and "esquisse" is a source of irritation and gives the impression that our schools are exotic imitations of those existing in Paris. British architecture should have sufficient native soil from which to produce fine modern work without going abroad and appearing "precious" in the eyes of the ordinary man; besides, Parisian names transported into this country suggest luxury and expense, the very qualities that should be disassociated most strongly from the present-day architect. The Englishman is well aware that he pays more for Poularde Rôtie than he does for roast chicken, and he naturally assumes that an Esquisse must be a more expensive affair than a study. Let us drop these affectations and talk English.

Noise.

SOME months ago we reviewed a paper by Professor Spooner on the fatiguing effects of noise and the necessity for eliminating it as far as possible from town and industrial life, and we are glad to read that the Bromley Magistrates have fined a motor cyclist for driving a machine without a proper silencer. People who by nature have no regard for their neighbours should have consideration instilled into them by the imposition of increasingly heavy fines. *The Times* refers to this case as one of importance to motor cyclists, and we hope that these, as the worst offenders on the road, will take the hint.

Royal College of Art.

THE exhibition of the works of old students of this College should not be without interest. It is the first exhibition of the kind and will include works of dead as well as of living artists. It is proposed to divide the exhibition into various sections, one consisting of examples of the fine arts, another crafts and design, and another of manufactured articles. The President and Council of the College invite owners to lend works in order that the exhibition may be as representative as possible. The roll of students includes such names as Sir E. J. Poynter, Sir H. Herkomer and others of the late Victorian period. We shall not, however, be very much impressed with some of the popular reputations of that period, in the light of the changes of outlook which have replaced so much of our old thinking about art. It will, therefore, provide an opportunity of much interest in comparing the two.

GENERAL NEWS.

Fifteenth-Century Chimney-piece Discovered.

According to *The Times*, a carved stone fifteenth-century chimney-piece was recently discovered buried under a thick coat of plaster, in one of the walls of the great hall at Godminster Manor, Bruton, Somerset. The jamb mouldings are partly combined with the trefoil ornament on the lintel, an harmonious simplicity of line and proportion which retains all the freedom of Gothic art. The reversal of the trefoil ornament on the lintel is almost unique. The repair of the chimney-piece was of unusual difficulty, but was successfully performed under the direction of Mr. A. J. Pictor, F.R.I.B.A., of Bruton. The span of the arch is 8 ft. 2 in., and the height from the floor level to the under side of the centre of the arch is 5 ft.

The Works of Goya.

We had recently an opportunity of seeing something of the work of Goya at the Exhibition of Spanish Art at Burlington House, though not enough perhaps to enable anyone to form an entirely fair opinion of his work. His ability as a portrait painter will, however, be well demonstrated in a volume issued by Constable & Co., with 58 plates in collotype and a translation by Mr. Selwyn Brinton, M.A., of the admirable book by Señor Don Aureliano de Bernete. There are close on three hundred authenticated portraits by Goya. Judging by Mr. Brinton's work one would be inclined to think the Spanish writer receives a more adequate rendering in translation than so often falls to the lot of a translated English author.

The Ministry of Agriculture.

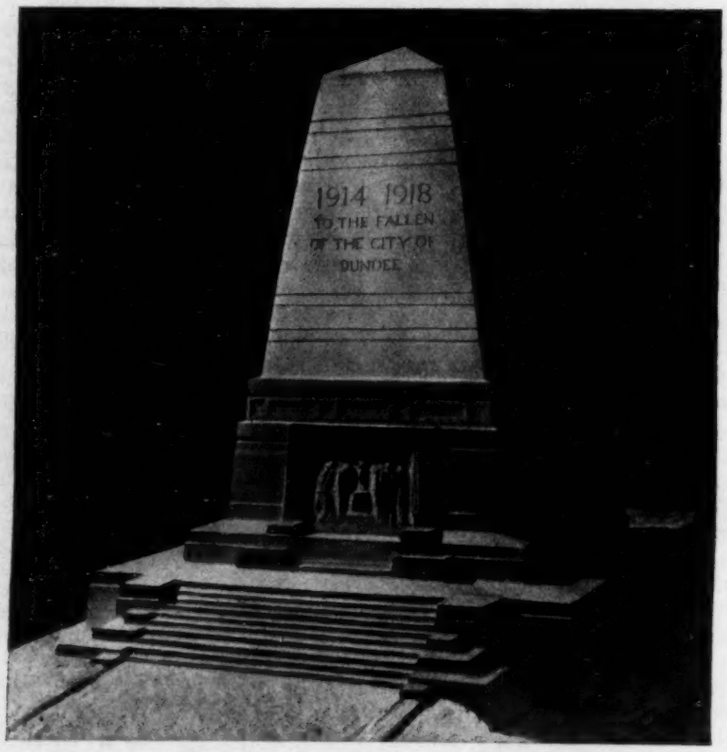
It is announced that Sir Lawrence Weaver will shortly relinquish the post of Second Secretary and Director-General of Land Settlement at the Ministry of Agriculture, in order to take up the appointment of Director of the Art Section and the Agriculture Section of the British Empire Exhibition, 1924. In view of the approaching completion of the Land Settlement scheme and of the reduction in the work of the Ministry owing to the repeal of Part II of the Agriculture Act, it has been decided that the vacancy created by this retirement shall not be filled.

Leicester Galleries.

The autumn season at the Leicester Galleries, Leicester-square, will open on October 7 with three exhibitions of varied interest. A series of etchings will be shown of the world-famous statesmen who took part in the Washington Conference and who gave sittings to the well-known New York artist, Mr. Walter Tittle. Mr. Tittle will also exhibit drawings of some distinguished authors.

Memorial Institute at Bristol.

A new institute, built as a memorial to the men belonging to Horfield Baptist Church, Bristol, was opened on Monday by Lord Pontypridd. The exterior of the new building has been designed to harmonise with the church adjoining. It has pennant walling and Bath stone dressings, and in the centre is a large panel upon which has been placed a granite tablet bearing the names of those members of the congregation who fell in the war. The building is approached by broad paved paths and steps, and is connected with the church itself by covered ways. On the ground floor are two rooms, 39 ft. by 24 ft., two smaller classrooms and a large room in front. On the first floor is a large hall 60 ft. by 39 ft., two classrooms and lavatory accommodation. Four large classrooms are on the second floor, and on the third floor a billiard room has been provided. The architect is Mr. Charles H. White, A.R.I.B.A.



Design for War Memorial, Dundee.

MR. V. O. REES, Architect, and MR. ALLAN HOWES, R.B.S., Sculptor.

[The site for this memorial is on a hill at the back of the town, 560 ft. above the sea. This design was to be 56 ft. high from the pediment, and 36 ft. wide at the base; there would be no mouldings or ornament, but facing the sea would be a large panel of low-relief sculpture. The authors were Mr. V. O. Rees, architect, and Mr. Allan Howes, R.B.S., sculptor.]

COMPETITION NEWS.

St. Bartholomew's Hospital.

It is stated that the rebuilding of St. Bartholomew's Hospital may be discussed by the General Court of Governors next year. A resolution has been submitted by the Scientific Sub-Committee appointed in connection with the organisation of the celebration next June, the eight-hundredth anniversary of the founding of St. Bartholomew's Hospital by Rahere. It proposes that a competition be held, under the direction of the President of the Royal Institute of British Architects, to provide plans for rebuilding the hospital; and that a sum of money, not exceeding £1,000, be allocated for the purpose of providing prizes.

Hospital Architecture.

To obtain for the typical small community in America a hospital building which is at the same time efficient in arrangement and creditable in architecture, *The Modern Hospital* has inaugurated a competition, open to all architects. Premiums amounting to £1,000 are offered. The jury of award is to be composed of two architects, two hospital superintendents, and a graduate nurse who has had experience as superintendent of a small general hospital. The competition calls for plans of a general hospital of from 30 to 40 beds. Registration for the contest must take place on or before November 15, 1922, and the final date for submitting designs is January 15, 1923. The general programme of the contest may be had from *The Modern Hospital*, 22–24, East Ontario-street, Chicago. A copy of the conditions may be seen at *The Builder* office.

Port Said.

Designs for a monument to be erected at Port Said, Egypt, to the memory of soldiers of the Australian and New Zealand Forces, are invited by the Australian Department of Defence. Designs must be the work of sculptors and architects of British nationality permanently resident in Australia or New Zealand, and Australian and New Zealand sculptors and architects in other countries. The cost is limited to £11,000. Designs must be delivered by March 31, 1923. Premiums of 250 guineas, 100 guineas, and 50 guineas will be paid for the designs placed first, second, and third. The assessors appointed are Major-General Sir J. Talbot Hobbs (architect); Mr. G. V. F. Mann (Director of the National Art Gallery, Sydney); and Mr. G. Sydney Jones, A.R.I.B.A. Further particulars may be had at the office of the High Commissioner for Australia, Australia House, Strand, W.C.

Auckland.

The Secretary of the R.I.B.A. has received a cable stating that all the premiums in the Auckland war memorial competition have been awarded to New Zealand architects, three of whom have been students of the Architectural Association. Photographs of the winning designs are to be sent to London at an early date.

Essay Competition.

The Architects' and Surveyors' Assistants' Professional Union is offering a prize of five guineas for a short essay on "The true Function of the Technical Assistant in the Building Industry." The competition is open to all professional and technical workers associated with the building industry, and essays must not exceed 1,000 words in length. Sending-in day, October 31. Further particulars from the Secretary, 36, Victoria-street, S.W.1.

Other Competitions.

Other competitions still open include the following (the dates given are, first the sending-in date, and second the issue of *The Builder* in which full particulars were given): Colombo Town Hall (Nov. 1, July 14); Labour Saving Bungalow (Nov. 1, Aug. 7); *Chicago Tribune* Building (Nov. 1, Sept. 15); Newcastle Baths and Public Hall (Sept. 15); Birkenhead War Memorial (Sept. 15, Dec. 29); Cricket Pavilion (Sept. 22); Clapton Garage (Sept. 22).

CORRESPONDENCE.

"A Freedom of Sorts."

WE have received from "Isis" the following reply to Mr. Maxwell Aylwin's letter in our issue for August 18:—

DEAR MR. AYLWIN,—I am so sorry not to have replied earlier to your letter, which interested me much, but absence from home and the many pressing claims on my time are the cause, and not any disinclination to respond to your invitation, which was, I think, to ask from me, in return for yours, a confession of my own faith. This is not easy, because I cannot give you my creed and address only architecture, because life comes before art. Moreover, the word "creed" rather terrifies me, lest I should forget Hamlet's admonition that "there are more things in heaven and earth than I have dreamed of"; but with such loophole of grace—here goes.

May I first clear the ground in order to detach myself from what I do not mean. I am equally opposed to "mediævalisms" and revolution, and yet your letter in different passages seems to accuse me of both—of "morbidly dwelling on the past" and "letting loose revolution." It is difficult in such brief limits to be clear, but you have misunderstood me.

I find, then, that human and not economic considerations are the dominating factors in life.

From what you write you put too much stress on the latter, and if I have understood you, present conditions are natural, not artificial; inherent rather than imposed by those conditions. For me it is not natural that millions toil in the smoke of cities, one man snatching the bread away from another, if he should suffer any failure in the struggle, like a lot of "crabs struggling in a pail." I do not deny the struggle, but I entirely deny that this is either the natural or necessary relationship of men, or that it is artificial to suppose there is not a better one. And men do not really believe in it themselves, because so much better than their present so-called belief in the "sway of economic forces," necessity, circumstance, "fate stronger than man's will," and all the desolating untruths that they have put between them and their own better hearts. At the same time, I do not accuse your heart, but your reasoning; and am sure of your equal desire to get at the truth.

It is no part of my creed to "dwell morbidly on the things we have lost since the Middle Ages," and I have certainly never countenanced "artificial" attempts to call them back. I agree with you that our task is harder, but not with your interpretation of the task. The security in which the Middle Ages lived cannot be identical with ours. They had a faith, which they could accept and within which they lived. They did not doubt of life, though they might fail in its practice. In such a belief life found a certain security and completion—a house of life. As has been said, "they lived in their dream, and the dream came true in their work." They did realise their spiritual conceptions, but we have not yet realised ours, and because of this the dream has not yet come true in our life. Modern Europe with its increased complexity and growth has to realise and interpret into life a belief fitted to the more developed character of its conceptions. To give intelligible meaning to the ideal of democracy and to translate it into life, individual responsibility has to become more direct and personal—not delegated and vicarious. It is for you that the world waits—as it waits for each one of us—to rise out of these half-truths of "economic" struggle, the "crabs in the pot" interpretation of life, into the dream, which relates life and which justifies it. This sense of responsibility, under whatever frailty the mediæval world achieved. They believed in their dream as we must now embrace ours.

You tell me that the workman no longer lives in the "atmosphere that breathes fervour," and just because he does not, failing self-expression, we suffer from all the restless fermenting of the suppressed forces that threaten society to-day. Your alternative of "a private in a vast army, willing and obedient," which can conquer the world, is surely the old outworn phraseology; our business is not to conquer but to convert it. It is the dream not the drill sergeant, beauty not conquest, that will restore life, though I think you have said that it does not matter if personal craftsmanship disappears altogether!

Progress for me, if there is any intelligible meaning in the word, means progress in human relationships. Really nothing else matters, as it also includes everything else. I understand from you that man under the modern notions of "progress" has had to give up nature for the smoke of factories and human relations in a struggle for life under the sway of economic forces, which when we lift the veil from them are neither more nor less than the shadow projected by life itself, darkening and devastating it when false and ignorant, illuminating and glorifying it when true.

Do we, any of us, quite lift ourselves to the level of our own thoughts, to make them the governing factors of our life? We should give a different account if, instead of the desolating theories about fate and economic forces, we trusted this witness of our hearts more entirely. While I should like, with you, to see our institutions raised to the highest level of public service, I am unable to share your belief that in themselves either councils, or "the cult of fine architecture," or academies, or the technical press, can, in the way you suggest, supply what is needed. There is a danger, on the contrary, in too great dependence on organisation and machinery, which tends to weaken the sense of first-hand responsibility and to bind rather than to free men, and unless well administered includes all the evils that nourish in bureaucracies.

As regards post and lintel construction, the Greek orders have become the sepulchres of man's spirit. I would like them superseded from any doctrinal ascendency, and construction finding its own free expression for service, aided, of course, by those precedents and examples which lift the mind to the full dignity of its own conceptions, using the past as not abusing it.

The forms through which we build, however, whether Greek or Gothic, are not the fundamental forces, but that, whatever we build, or however we build, it should include the maximum corporate vitality of expression. Unfortunately, architecture too often gives witness to the poverty of the single mind, and its wings droop for the need of this ampler air. No doubt the objects it has to serve will determine the kind of architecture. If the service were to become preponderatingly a service to the mad economic struggle for money, we should get the kind of architecture which such a commercial ideal promotes. It does not matter from where we start, it is to where we are going that is of such enormous consequence, so that whether we approach our work through Greek or Gothic precedents is the least part of the matter.

Perhaps the difference is not so great between us after all. I realise full well the difficulties of the time. Perils no doubt grow with our growth. Man, in some ways, was safer as a savage—less safe as he marches forward in the great adventure; but whereas the mediæval world did find anchorage and exaltation in the sense of a divine ruling of their life, we only half believe in the much nearer ruling of that more Immanent sense within us. Doubting of our own beliefs, the weaker will of modern Europe, in distrust of its own better intuitions, because they ask more from him, places itself under the control of circumstances, necessity, economic forces, fate, and all the desolating fallacies that lie in such a point of view—fallacies which imperil the very existence of civilisation to day.

We have not to accept, but to lift ourselves out of all this—to the growths in man's spiritual development since mediæval days. This is not "mediævalism," but the spirit of mediæval belief shaped anew to our own needs. It is democracy—not revolution; because such beliefs will not loosen but bind society, lift it once more to the realisation of its own dream, and to the beauty which will save the world.

ISIS.

Rothesay War Memorial.

[This memorial is erected on the south-east corner of the Esplanade Gardens and facing Guildford-square. It is of grey Aberdeen granite for the lower portion, and on the four sides are fixed bronze panels forming rolls of honour for over 230 names, with rank and unit of each, while a dedication inscription occupies the upper portion of the front panel. The design is the work of Messrs. Charles E. Tweedie & Sons, architects, Edinburgh, and was selected in open competition. Mr. John Keppie, A.R.S.A., architect, Glasgow, was assessor. The figure and other bronze work was modelled by Mr. C. d'O. Pilkington Jackson, sculptor, Edinburgh.]

Worcestershire Archæological Society.

Part of Worcester's wealth of antiquities was inspected last week by about fifty members of the Worcestershire Archæological Society. The party assembled at St. Swithin's Church, and commenced the tour under the guidance of Mr. F. T. Spackman, F.G.S. St. Swithin's, which was built in 1736, was studied as an example of the work of Thomas White, a Worcester architect, said to have been a pupil of Sir Christopher Wren. Queen Elizabeth's house, with its antiquities and Eastern curios, was visited. At St. George's Catholic Church a stained glass window was admired, this being the work of John Egington, formerly of Maryvale, who discovered the secret of old stained glass, but took it to his grave. Other places visited were the old city wall, the exterior architecture of the "Pheasant Inn" (which was built about 1580) and Tudor House.

In the morning a committee meeting was held at which, in addition to settling arrangements for the winter programme, an interesting presentation was made to the President (Mr. J. Humphreys) of a Presidential badge, to be worn in the first instance by him and afterwards by his successors.

HOUSING STATISTICS AND IRRELEVANT CRITICISM.

WE have received from a correspondent the following comments on housing and the recent manifesto of the National Federation of House Builders in particular :—

The various and conflicting opinions upon everything connected with house-building which appear in the daily press remind us of the well-known saying attributed to Abraham Lincoln :

> " You can fool all the people part of the time, part of the people all the time, but you cannot fool all the people all the time."

On the one hand the Ministry of Health have given prominence to certain statements regarding the cost of houses, and on the other we have the Council of the National Federation of House Builders issuing a manifesto in which they state that the reduction in the cost of building does not correspond with the figures published by the Director-General of Housing. To a layman it seems obvious that there must be some reason for these assertions and counter-assertions, otherwise there would be no object in trying to compare unequal things which should be contrasted. It is an extraordinary fact—which will not be without significance to the building trade in time to come—that for the last few years practically no statement regarding housing policy has been allowed to remain unchallenged; and yet there has been no attempt to correlate criticism or bring the various arguments to common ground.

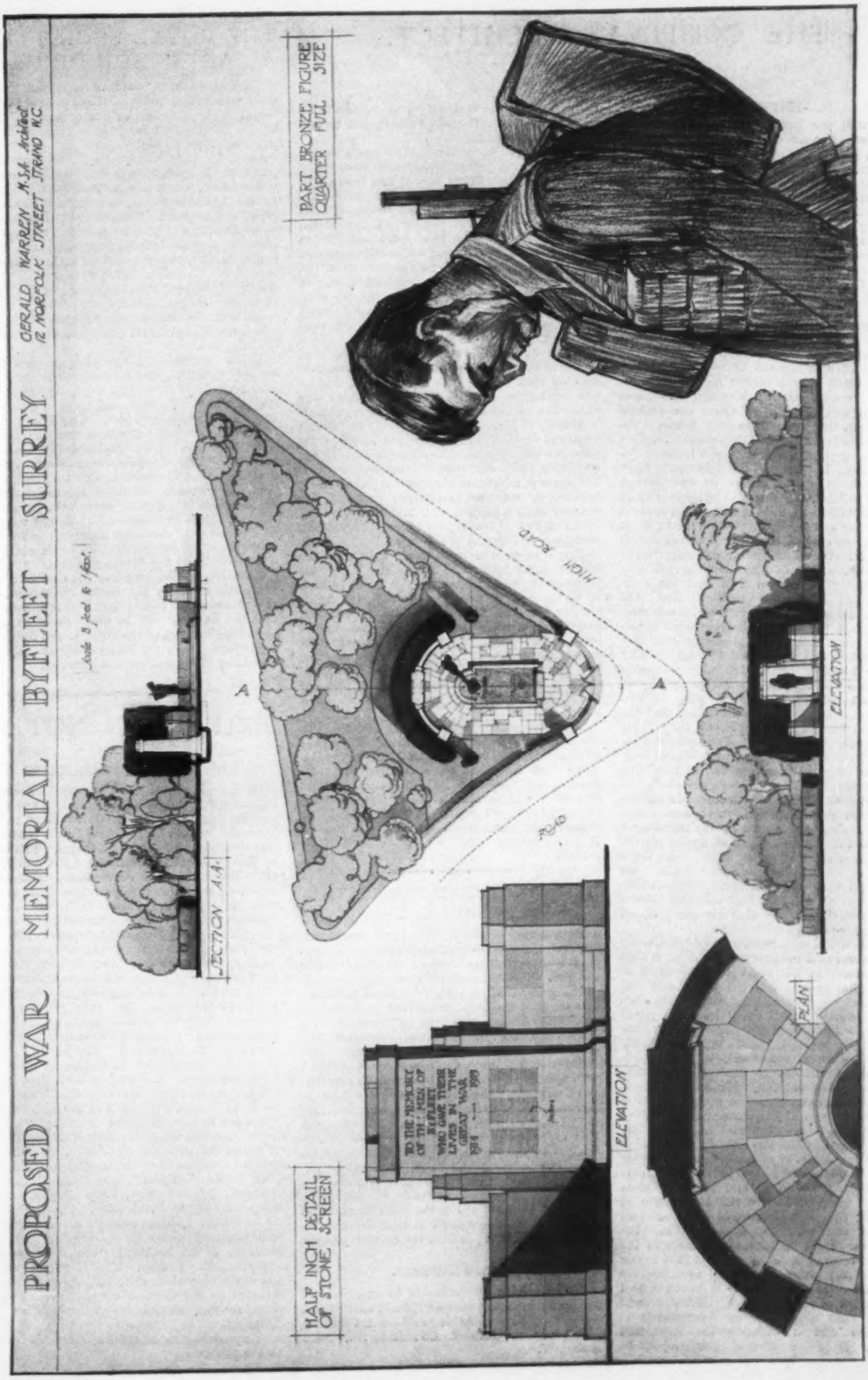
To the average business man the discussions seem to be carried on with a total disregard of facts or even the mentality of the public. It is well to remember that although building has been made to appear complicated, it is nevertheless a simple industry compared with many others. In the cotton trade, for instance, there are thousands of grades of cloth made from hundreds of different yarns; yet in the whole of this vast industry we do not appear to find business men wasting time discussing from the house tops the ethical values of transactions which embrace different things. The position is getting rather absurd, and is something of a joke to the economist who realises that not a day will be wasted in discussion when the purveyor can see the slightest margin of profit for himself.

To the layman who is inclined to think badly of the building trade, I would point out that it is one of the few industries whose commodities are controlled; that there are too many people interested both in processes and in results; and that the balance of power has moved as the economic conditions altered. There ought to be no need to go into elaborate details of building costs as a reason for not building, when it seems certain that nothing can prevent a boom in house-building directly the price index makes the commodity a business proposition. The economic value of houses in relation to the rental is certainly a problem which interests most people, but as this is the one factor which will settle itself mathematically, the public naturally wonder what are the main issues which are likely to be hidden behind these statistical exchanges. The layman has seen a higher standard of housing coupled with an economic failure, and no one comes forward to explain the situation to him, by dealing separately and fairly with these two factors. The economic side of the question has been stressed unfairly, and the design of the houses has received less than justice. The National Federation of House Builders may have supplied sufficient data to show that house-building is not profitable just now as an investment, but their speculations upon the future trend of prices may be wrong, and the value of their statement is seriously obscured when they offer gratuitous opinions upon the design of houses. The economic situation cannot be controlled, but the whole conception of housing involves social problems upon which many people have ideas, and are not prepared to accept the builders' ideas without further investigation. It would be difficult to find anything to equal the following extract from the House Builders' statement, both in its sweeping generalisation and ambiguity : " Any comparison between the cost of a ' Council ' house and that of a house erected to be sold to an occupying owner is impossible, for the one is a mass-production article, with every little embellishment ruthlessly cut away, and the other has the individuality, the comforts and conveniences of a home." I had always imagined that the speculative builder prided himself on his mass-production methods and " articles," but I always regretted that he seemed constitutionally unable to abandon his " little embellishments." The application of the word " individuality " to his houses is manifestly absurd; they are not individual in any sense of the word; but are, in most cases, merely collective rows of blatantly vulgar and monotonous units. The whole sentence is so paradoxical that it seems difficult to believe that we can have guessed the correct interpretation to it. I do not wish to be unfair in my criticism, but I take it we are discussing workmen's dwellings; if so, it is correct to say that " any comparison is impossible." Comments of this nature are trivial, and only serve to point the moral : that statistical wrangles cannot do any harm since they mean nothing; but conventional hypocrisy is the one thing which will bring disaster, and kill any hopes of improving housing conditions in the future. The problem is a serious one, affecting the social conditions of the nation, and it is evident there is great need for a select committee to separate criticism which is unbiassed from that which is irrelevant with a view to obtaining absolute safeguards through legislation.

The great reduction in building costs has brought much nearer the resumption of building by private enterprise, and it may be that as this time approaches we must expect these statistical challenges as a preliminary to getting to work. Little harm can be done if these discussions can be confined to the economic side of a problem, when some day, I hope, we can look back upon them as being merely of academic interest. At the moment it is too much to expect that we shall see the economic factor from the same standpoint. The Federation states that " prices have been rushed up to impossible figures by reckless schemes," but, as a statement, I am inclined to question whether this is the whole truth. We have not yet seen figures proving that building costs rose higher than any other commodity, nor do we know to what height prices had risen before the houses were commenced. It is fairly certain that the amount of work on industrial buildings was greatly in excess of the available labour, and it is probable that the housing schemes had less effect than is commonly imagined in forcing up building costs, though they had a great influence in maintaining high costs when prices in other trades were deflating. It seems obvious that a huge programme of building rendered necessary by artificial conditions would undoubtedly have had the effect of keeping the costs of building at an artificial level for a considerable time, and it is one of the enigmas in the housing problem that we never get the two aspects of this or any other question presented to us at the one time. We have never seen the costs of the Government houses worked out on a pre-war basis of costs and rentals, presumably because it is never assumed that these conditions can ever be expected. Consequently it seems to be considered advisable to confuse the layman thoroughly, by comparing houses which are different, and by ignoring conditions which presumably we are to suppose are to remain stationary. There are quite a number of points on the economic side of the problem which require further investigation before embarking on any general criticism of the housing schemes, either in the broad conception or in the details of design.

It cannot be emphasised too strongly that many individuals will expect legislation to help them to obtain some of the benefits and advantages which have been obtained collectively for the working classes in the Government housing schemes. Small houses will be more sought after in the future; they ought to proceed on organised lines and be planned as a whole, with due regard to the beauties and amenities of the surroundings. A moment's reflection will show the difficulties which we place in the way of the individual if we allow criticism to run riot, with no other object, apparently, than to prove that something is wrong elsewhere.

Writing to *The Times*, Mr. Norman McKellen, Secretary, National Federation of House Builders, says :—I notice in *The Times* on Wednesday that the Ministry of Health take exception to the statement made by the National Federation of House Builders that the cost of building is now about 125 per cent. above the pre-war cost, but in the details which they give they do not deal with the main point, that Sir Charles Ruthen was wrong in stating generally that the cost of building was only 60 to 70 per cent. above pre-war. However true the statement may be as it applies to Government contracts, it does not hold good in the case of houses which are built to attract a purchaser. . . . In short, the houses which are built to sell to occupying owners are quite different from those which Sir Charles Ruthen had apparently in mind when he made the statement referred to. The National Federation do not suggest that houses are not being built at the prices published, but I feel sure that when Sir Charles Ruthen stated that houses which cost £816 in April, 1921, were now being built at Nottingham for less than £300, he overlooked the fact that the Nottingham houses were quite different in design from the £816 houses, and very much poorer in convenience.


PROPOSED WAR MEMORIAL BYFLEET SURREY
GERALD WARREN M.S.A. Architect
12 NORFOLK STREET STRAND W.C.
PART BRONZE FIGURE QUARTER FULL SIZE
Scale 8 feet to 1 Inch.
SECTION A.A.
HIGH ROAD
ROAD
ELEVATION
HALF INCH DETAIL OF STONE SCREEN
TO THE MEMORY OF THE MEN OF BYFLEET WHO GAVE THEIR LIVES IN THE GREAT WAR
1914 ---- 1919
ELEVATION
PLAN

Byfleet (Surrey) War Memorial.—Selected design. MR. GERALD WARREN, M.S.A., Architect. (*See p.* 448)

THE COMPLEAT ARCHITECT.

BY DUDLEY HARBRON

II.—INSTRUCTION.

WHETHER the prospective architect is the fortunate possessor of aptitude or not, it is common ground that, for his own sake and for the community he desires to serve, he must take all means within his reach of obtaining instruction from the hands of those qualified to impart the same. He cannot too early realise that his study should follow some logical course of development if he hopes ultimately to arrive at the desired goal of proficiency. This course and correlation is arranged for students of architecture at the recognised schools. But for their less fortunate fellows a "Schema" has to be followed as best they may.

The Royal Institute of British Architects' Board of Architectural Education has prepared an admirable broad-minded tractate, indicating the lines of development to be followed, and every student should render himself familiar with its precepts. Although recognised schools are fairly well distributed, there are centres too distant, and parents too poor to afford the educational advantages that they provide, and we cannot fairly limit the field to the fortunately-situated few. In their case the only course to be followed is to attend classes at the nearest technical college or art school. In some of these latter, unfortunately, there is scant consideration given to any systematic architectural education satisfying the conditions of the Board of Architectural Education and leading naturally to the Institute Intermediate Examination, and ultimate qualification. It is time that the local Educational Authorities realised that the syllabus of art and technical instruction designed to instruct in the subjects bearing upon architecture have a balanced relationship, and that they be asked to arrange that at least the day and the hour of instruction of inseparable subjects do not conflict—youth as at present constituted being incapable of being in two places at the same time—and, further, that the instruction be given by architects, they being alone capable of appreciation of the relationship.

Assuming that the student is able so to arrange his day or evenings that they can be employed sitting at the seat of wisdom in the receipt of progressive instruction in the history of architecture, building construction, mathematics and design, the direction needed in this last subject is too often ill supplied, when all that it should amount to is the application of the other three subjects of study to the business of life. On this ground alone it is important that the student should fix in his mind the fact that these seemingly detached branches of study are one and interdependent.

The sole object of a knowledge of the history of architecture for the student of the art is that he may form in his mind a background or content, that he may pass along the road trod by his ancestors, that he may observe how they met and overcame difficulties, developed possibilities, how their times are mirrored and reflected in their works; that thus reasonably furnished, warned, instructed, he may apply his garnered wisdom to the problems that immediately confront him. He should appreciate that building construction is the "basis of architecture," offering him the means or skeleton; that it suggests the form and treatment, the *motif*, the method and the manner, of enclosing and covering space, of so applying and ordering material that it render service to the community. That mathematics afford him the exact data by which he provides for the distribution of the loads, the counteraction of those external forces at war with equilibrium; that the application of his mathematical results in the mass and form of material result in that repose and durability which is essential to expressive satisfaction. In sum, that it is by the equal development of the respective utilities of these subjects that a satisfactory background is formulated and a capacity for expression attained. If one or other of these subjects be allowed to assume domination the studen may develop into an eminent specialist, but he will not become an architect.

Generally the whole trend of his study should commence with patient analytical observation of what has been done, how it has been done, and why it has been done. The latter will lead him to reflect, compel him to reason with himself, to weigh and ponder on the unseen motives and obstacles that have resulted in the architectural expression under consideration. In so doing he will unconsciously arrive at the mental goal—the selection and formulation of his own ideas in terms certainly not his own. But that need not trouble him, for originality, in the common acceptance of the word, does not exist except as a form of decadence. That which is an absolute break with the past is of no use in the present. It is out of the past that step by step the present is fashioned, and in the tendencies of the present we have the indication of the future. Architecture, if it is anything, is life. If architecture is at present formless, chaotic, it is because the voices of the time are out of tune. Because the Church has lost faith and touch with the nation; because the power of an aristocratic oligarchy has waned; because as yet the commercial creed of the country is in a process of transition, of halting between two opinions; because the modern version of democracy is immature.

The student will learn these things in the course of his joust with the world; it is his business to see that they do not unhorse him. If he is content merely with that which his teacher can impart he will not travel far—the best pupils surpass their teachers. All that a teacher can properly do is to stimulate and encourage, direct and inspire, the pupil. The best that a pupil can acquire is a desire to know more, and an idea as to how that extension of knowledge may be attained—that is, to learn how to learn.

The mere collection of facts is facile. It is the employment to which we put them, the spirit we infuse into them, that matters. The scope and intention of education being to develop the mind, to form a round intellect free from angularities, it behoves the student to apply himself more particularly to the unpalatable elimination of his weaknesses. If he overcome these he may be sure of his reward.

ARCHITECTURAL ASSOCIATION DESIGN CLUB.

THE Council of the Architectural Association has established a Design Club for members, past-students, and others engaged in offices during the day. The aim of the Club will be the study of the design and planning of modern buildings. The work of the Club, which will have its own committee of members, will be arranged by a Jury consisting of practising architects and members of the A.A. teaching staff. Two members of the Jury, *i.e.*, a practising architect with special experience of the problem involved and a member of the A.A. staff will supervise the carrying out of each subject set and will visit the Club at least six times during its execution. Monthly subjects and 12-hour sketches will be marked by the Jury and criticised each month. The Club premises will be 36, Bedford-square, and will be open the whole year day and night. The official programme starts on September 30, 1922, and subjects will be set until April, 1923. Particulars can be obtained on application to the House Master, A.A., or from the Secretary of the A.A. Club.

Portrait Exhibition.

An exhibition of portraits in marble and bronze by an Italian sculptor, Mr. F. La Monaca, opens early in October at the Fine Art Gallery of Bromhead, Cutts & Co., Ltd., 18, Cork Street, W.

THE ROYAL SOCIETY OF ARTS' BUILDING.

CONSIDERABLE amount of renovation and redecoration is now going on at the premises of the Royal Society of Arts in John-street, Adelphi, W.C. The lease of the premises ran out many years ago, and about two years ago the Council decided to take advantage of an option to purchase the freehold and thus retain possession of the house, which was designed for the Society by the Brothers Adam, and which it has occupied for 150 years. With the aid of an anonymous donation of £30,000 sufficient money was raised to buy the building, the interior of which is now being thoroughly rebuilt and redecorated at a cost of a further £7,000 or £8,000. Mr. Arthur T. Bolton, F.S.A., Curator of the Soane Museum, who has made a special study of Adam work, was appointed architect for the alterations, which are being carried out by Messrs. Trollope & Colls, Ltd.

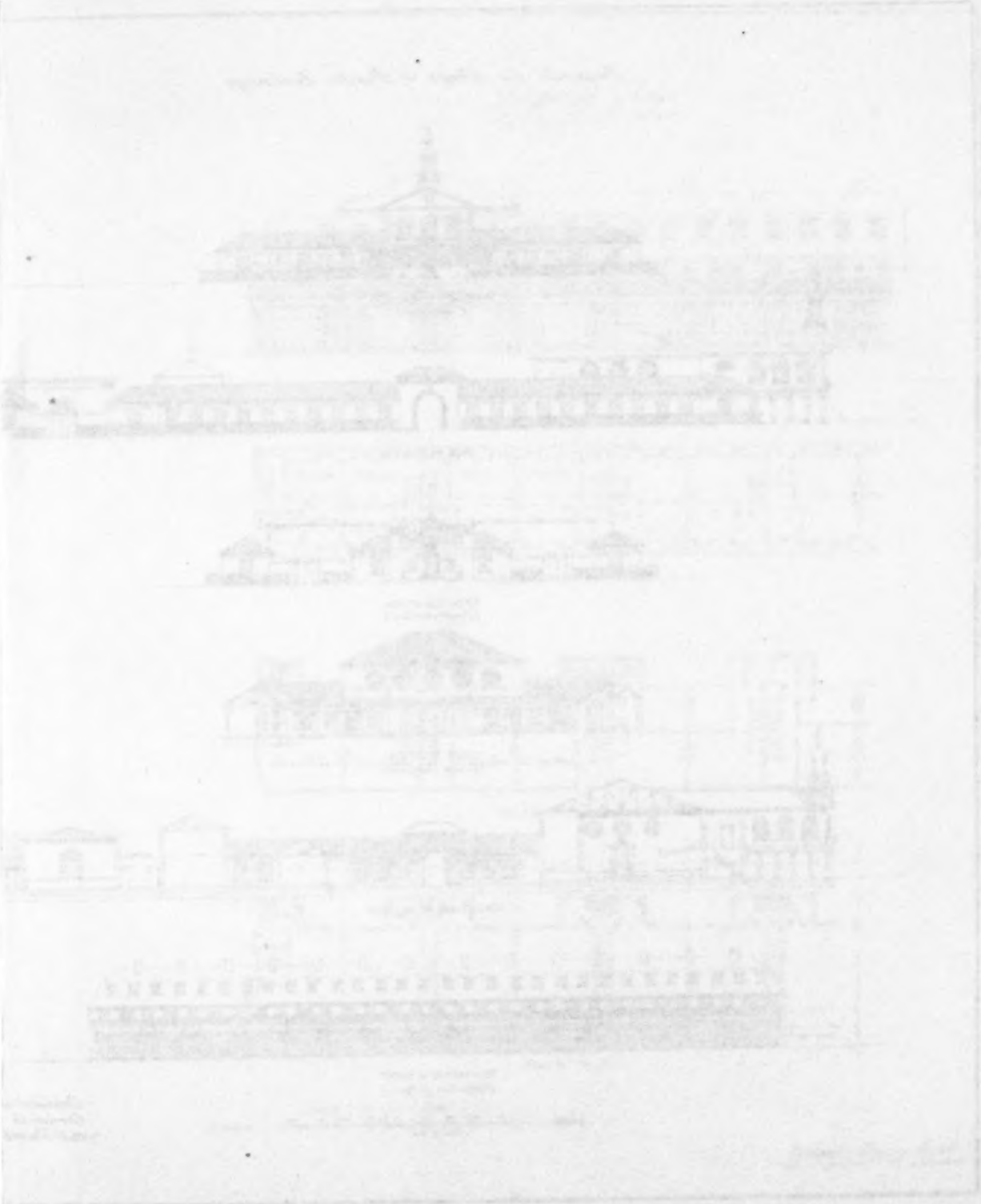
In the lecture hall the platform has been entirely removed, and by raising the floor it is now possible to see experiments, &c., from any seat in the hall; new and more comfortable seats are also to be provided. The ceiling of this room is to be painted white, and the electric chandeliers are to be replaced by alabaster bowl reflectors. The pictures are being cleaned, and the portraits re-arranged. On the ground floor the entrance hall is, at the suggestion of Sir Aston Webb, P.R.A., being enlarged by the removal of the two side walls. By the removal of the cast-iron cases the library is being considerably enlarged, and restored to the condition it was left in by the Brothers Adam.

Although the Society has been able to purchase the building, the money for the present alterations is still to be raised. It is anticipated that the building will be quite ready to carry on the useful work of the Society, and for use as a meeting place for other societies, by the beginning of November this year.

EXHIBITION NOTES.

THE COTSWOLD GALLERIES.

IN the pleasant little Cotswold Galleries in Frith-street, Soho, one may spend an agreeable time amongst pictures of the Cotswold country by Cotswold artists. The three little views of Cotswold buildings, an inn, a chapel, and a barn, by Russell Alexander, numbered 2, 4 and 5, are after the manner of conventional manuscript pictures; they are prettily composed but a little cold in colour. "Painswick," by Joseph Southall (7), is a pleasant transcript of an old Georgian house made a trifle restless in effect by the figures. "Tattershall" (8), well remembered by Lord Curzon's intervention, is finely set forth by Fred L. Griggs, in a little water-colour view; cloud and light give emphasis to the sturdy group of buildings. The next drawing is a pleasant study of mellow light by the same artist, and as a striking contrast to this we have his admirable drawing of "The Pass" (10), in which the texture and formation of rocks are finely rendered. A charming little drawing in quick perspective of "The Pipe and Tabor" inn, by F. L. Griggs, suggests well the architectural character in this delightful district. "Homeward" is a nice winter scene by Harry A. Payne. A delightful drawing by Joseph Southall, in pastel, wanders from the subject to "Tenby" (26). "The Cowherd" and "The Haunt of Ancient Peace," by Harry Payne, speak eloquently of the countryside. The exhibition, as a whole, hardly conveys a distinguished illustration of the special charm of the Cotswold country, in its beautiful stone buildings and characteristic scenery. The Cotswold artists can do better than this, but there are many devoted to the Cotswolds who should also be asked to set forth their beauties at another day. Excellent modern Cotswold furniture and other nice appointments afford an agreeable setting to the pictures.

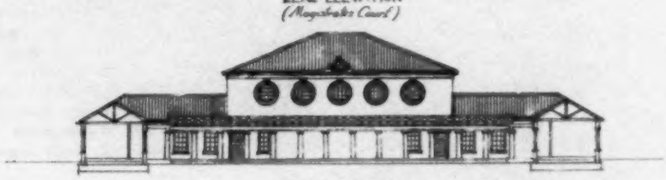


Proposals for Shops & Public Buildings

FRONT ELEVATION
(Town Hall)

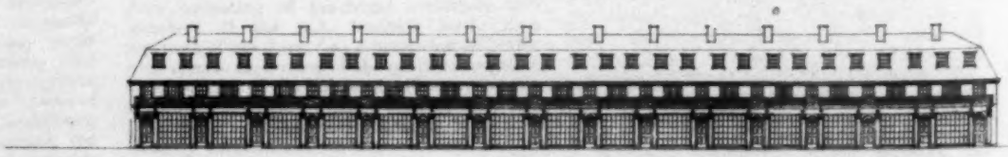
SIDE ELEVATION

REAR ELEVATION
(Magistrates Court)



CROSS SECTION
(Through Courtyard)

LONGITUDINAL SECTION

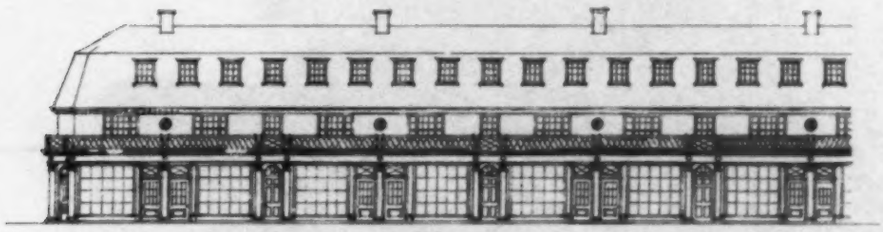


ELEVATION of SHOPS
(Station Side of Square)

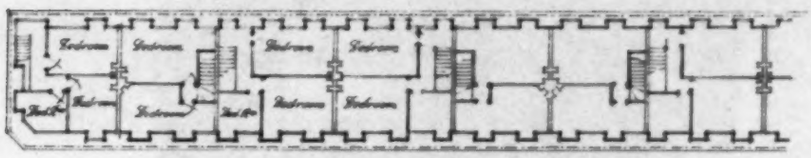
Scale of Feet

Architects and Surveyors
Architects
46 Gt Russell St WC

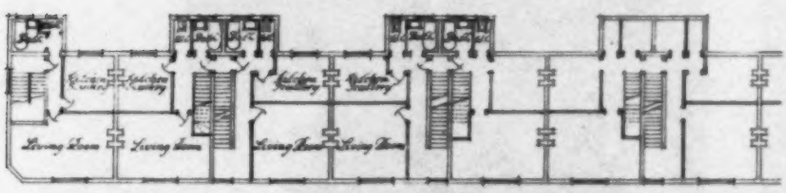
Proposed Shops with Flats over



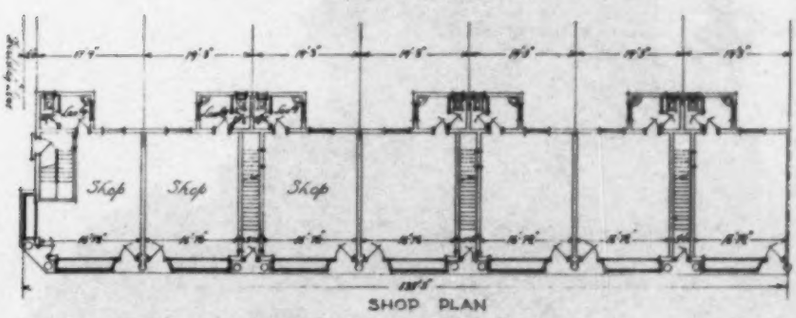
ELEVATION



SECOND FLOOR PLAN



FIRST FLOOR PLAN

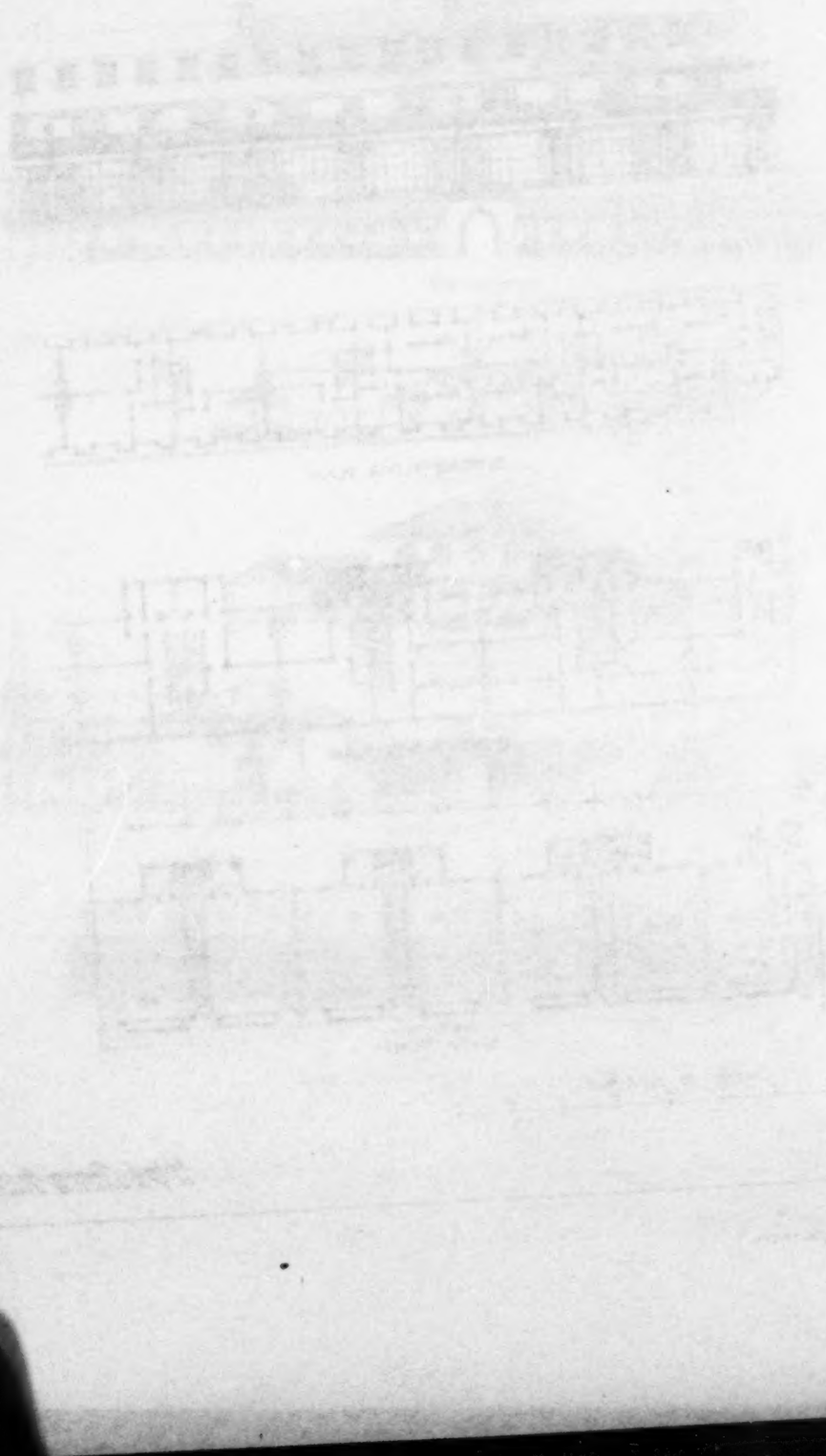


SHOP PLAN

Scale - ⅛" to 1 Foot

Adshead & Ramsey Archts
66 Gt Russell St London

ESSRS. ADSHEAD & RAMSEY, FF.R.I.B.A., ARCHITECTS.



North Wales Heroes' Memorial.—MR. D. WYNNE-THOMAS, Architect.

[This design illustrates the North Wales Heroes' Memorial now being erected at Bangor. The scheme is not the design which obtained first place in open competition. The Memorial Council, we are informed, were of opinion that the severe Greek character of the winning design would not harmonise with the University buildings, and it was decided that a gateway more in keeping with the present work should be erected at the corner of Ffordd Deiniol and Glanrafon Hill. The design has been kept simple, and the names of those in whose honour the memorial is being erected will be inscribed on oak panels carried round the walls of the memorial "Hall" on the first floor. The memorial is faced with Cefn stone; Roman stone paving to the ground floor; 24 in. square Sicilian marble slabs with a 2 in. border of Verde Antico to each square on the first floor; and coffered panelled ceilings in oak. The contractors are Messrs. John Laing & Son, Ltd., Liverpool.]

LEADING CONTENTS.

	PAGE
HEATING AND VENTILATING	439
NOTES	440
CORRESPONDENCE	443
HOUSING STATISTICS AND IRRELEVANT CRITICISM	444
TECHNICAL EDUCATION COURSES, 1922-23	448
ST. DONAT'S, GLAMORGAN	454
LEGAL SECTION	455
HEATING, LIGHTING AND VENTILATION	457
DOMESTIC HOT WATER SUPPLY	458
NOTES ON VENTILATION	459
ELECTRIC LAMPS AND FITTINGS	462
PROGRESS OF GAS HEATING	463
HEATING, LIGHTING AND VENTILATION OF THE NEW PENSIONS MINISTRY BUILDING	465
RECENT DEVELOPMENTS IN HEATING AND COOKING APPARATUS	466
THE BUILDING TRADE	468

ILLUSTRATIONS.

Tilbury Town-Planning Scheme.

The central portion of this scheme provides for a town hall, municipal offices, quarters for the fire brigade, police station and county court. In the centre of the scheme is a public square forming a thoroughfare for pedestrians with back entrances and magistrates' court and police station. Sites on the north and south sides of the road around the central group are to be utilised for shops, which it is proposed shall be built by private enterprise, allowing each occupier to provide the internal accommodation best suited to his business, but all to conform to one general scheme of elevation. The architects are Messrs. Adshead & Ramsey, FF.R.I.B.A.

Shopping Centre at Throckley.

This design (illustrated on p. 453) provides a small shopping centre for a housing scheme of some 250 houses. On each side of the open space is a small group of shops with living-rooms over. The central building provides for a large covered market which could be utilised for stalls, with a public hall over. The associated architects are Messrs Adshead & Ramsey, FF.R.I.B.A., and Messrs. Harvey & Wicks, of Birmingham.

Ipswich War Memorial.

This memorial was designed to be in harmony with the surroundings. The position on the site was determined by the large clump of trees which form a desirable background. A cross forms the central feature, surmounting the base upon which the names of the fallen are carved in Hopton Wood stone. Above this is carved the Arms of the Borough of Ipswich, encircled by a wreath, the symbol of Reward. With the exception of the base, bearing the name panels, it was proposed to execute the memorial in Portland stone. The design was submitted by Mr. C. T. Armstrong, A.R.I.B.A., in the recent competition. The first and second premiated designs were illustrated in our issue for August 11.

Newport War Memorial.

This design was placed second in the recent competition, in which Mr Guy Dawber was the assessor. The conditions were that the execution of the work would be superintended by the Borough architect. The first premium was awarded to Messrs. C. F. Bates, A.R.I.B.A. and Colin L. Jones, M.S.A., whose design was illustrated in our issue of July 14. A cenotaph was asked for to cost £4,000, and the site was rather cramped (20 ft. by 15 ft.). The solution illustrated is one of very many possible variations of the cenotaph idea. The authors of the design illustrated are Messrs. V. O. Rees & V. Ware, AA.R.I.B.A.

Byfleet War Memorial.

We reproduce the selected design for the Byfleet War Memorial, which will be situated in the centre of the village at the junction of High-road and Chertsey-road. The inscription and names will be upon a stone screen, in front of which, and placed centrally, will be a bronze figure of a typical soldier standing before a small white marble cross. It is proposed that the space between and surrounding the figure and the cross be allowed to grow wild with a judicious planting of wild poppies. Surrounding this feature will be stone paving approached from the corner by low wrought iron gates forming part of the metal railings. The architect is Mr. Gerald Warren, M.S.A.

New Premises, Regent-street.

The following new premises are being erected in Regent-street. The architect is Mr. T. S. Darbyshire, A.R.I.B.A., M.S.A. (Messrs. Yates, Cook & Darbyshire).

Nos. 187, 189 AND 191.

This building is being erected for The Triumph Auto Co., and is part of a block in which Mr. Frank T. Verity's "St. George's House," already erected, forms a salient feature. The lines of cornices, &c., of Mr. Verity's building have been carried through, and an attempt has been made in the simplified elevation to maintain the Greek character of St. George's House adjoining.

The general contractors are Messrs William F. Blay, Ltd., of 1, Dowgate-hill, E.C., and Mr. B. Bylander, of No. 26, Old Burlington-street, W.1, is acting as consulting engineer.

Nos 302 TO 312.

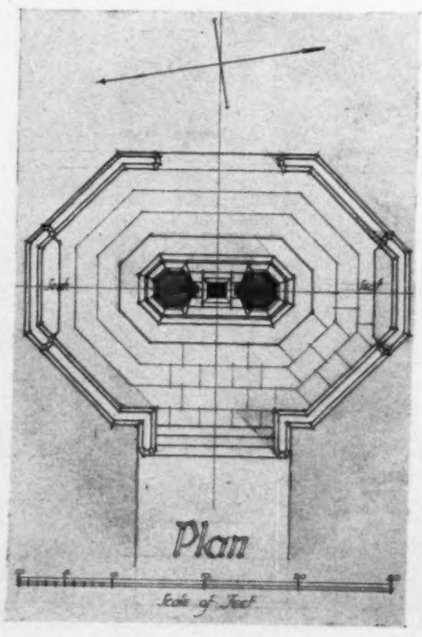
The whole of this block is now in course of reconstruction, and Nos. 310 to 312 are being erected by Mr. Walter J Fryer, of "Walmar House," 288–292, Regent-street, W. The constructional steelwork is being erected by Messrs. Dorman, Long & Co., Ltd., and the Portland stone by The United Stone Co., Ltd.

Nos. 223 TO 227; Nos. 189 TO 191; AND Nos. 302 TO 312.

These blocks form part of the general rebuilding scheme in Regent-street. In order to comply with the requirements of the Commissioners of H.M. Office of Works, the frontages from street to street have been designed so as to form, when completed, distinct and complete units The designs are so arranged that, in many cases, the existing party walls remain undisturbed, so that when the present leases fall in the new buildings can be erected in accordance with the approved design.

No. 223.

This building is in course of erection for Messrs. Frederics & Co., the glove manufacturers, and will form an imposing corner building. The general contractors are Messrs. D. G. Somerville & Co., of 120–122, Victoria-street, S.W.1. The Portland stone is by Messrs. Barnes of Vauxhall, S.W.; constructional steelwork by the Somerville-Barnard Construction Co., Ltd., of New Cross, S.E.; and wood block flooring by Messrs. Hollis Bros., Ltd., Hull.



Ipswich War Memorial.
MR. C. T. ARMSTRONG, A.R.I.B.A., Architect.

TECHNICAL EDUCATION COURSES, 1922–23.

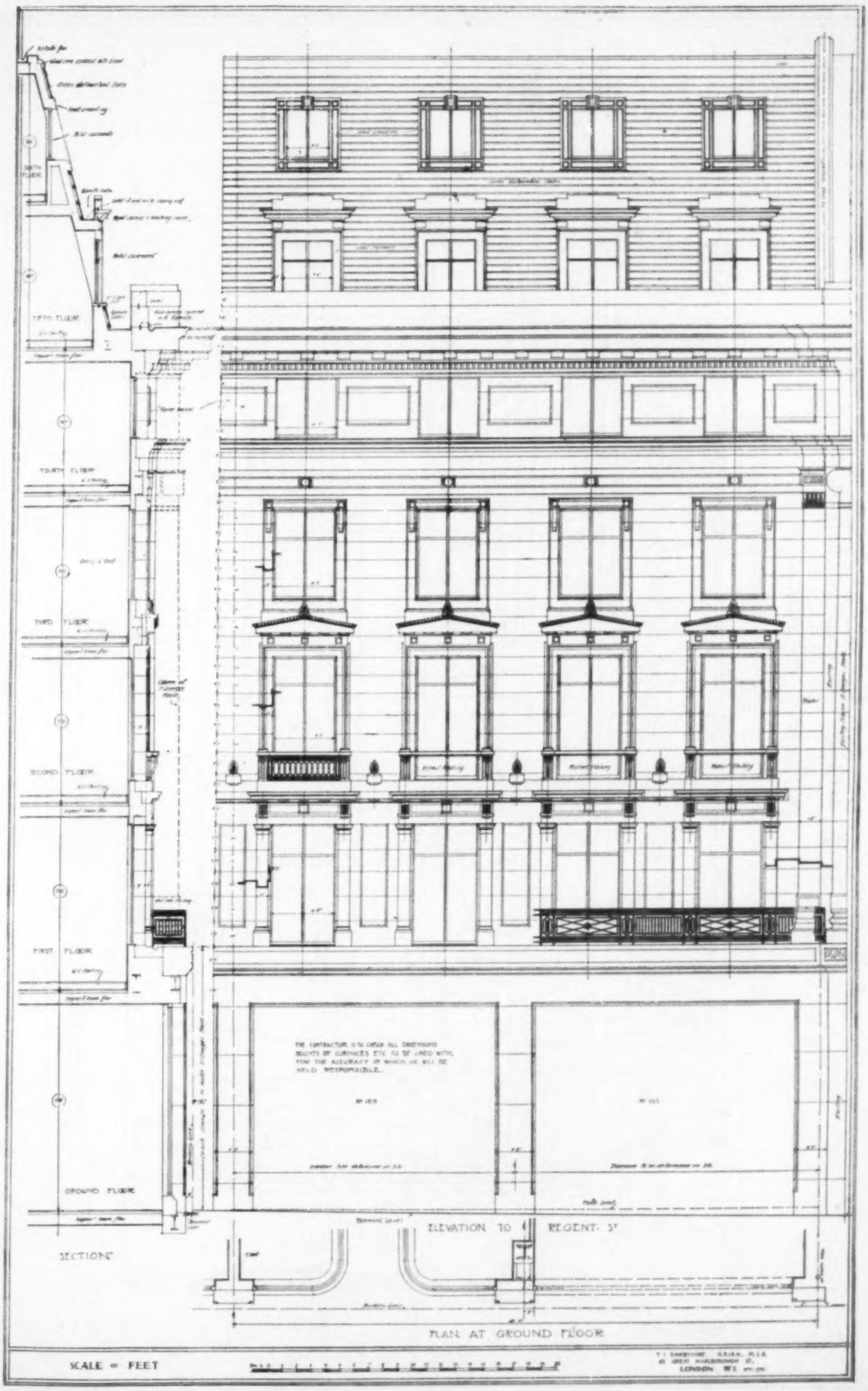
THE prospectuses of several of the technical educational institutes, containing the syllabuses for the coming winter, are now to hand, and include much of interest to parents and young people engaged on the difficult task of choosing a career.

Among the schools with architectural or building classes, the Royal College of Art, South Kensington (Professor W. Rothenstein, Principal), is maintained to give to advanced students an opportunity to equip themselves for the practice of art in drawing, painting, engraving, sculpture and design for architecture, decoration, handicraft and manufactures; and to give professional training to those who, after completing the ordinary College course, desire to prepare themselves primarily for teaching in schools of art. The College comprises five main schools, viz., Architecture, Design, Engraving, Drawing and Painting, and Sculpture. The School of Architecture, under the direction of Professor A. Beresford Pite, M.A., F.R.I.B.A., has two courses. The Lower Division Course provides an auxiliary course for the schools of drawing and painting, design and sculpture. This course deals with the relation of the arts to architectural history and style; the spaces and forms of buildings decorated in colour or enriched with sculpture; the employment of the crafts in furnishing and completion; and the study of geometrical draughtsmanship for technical purposes. The Upper Division Course is for the specialised study of architectural design by students intending to become architects.

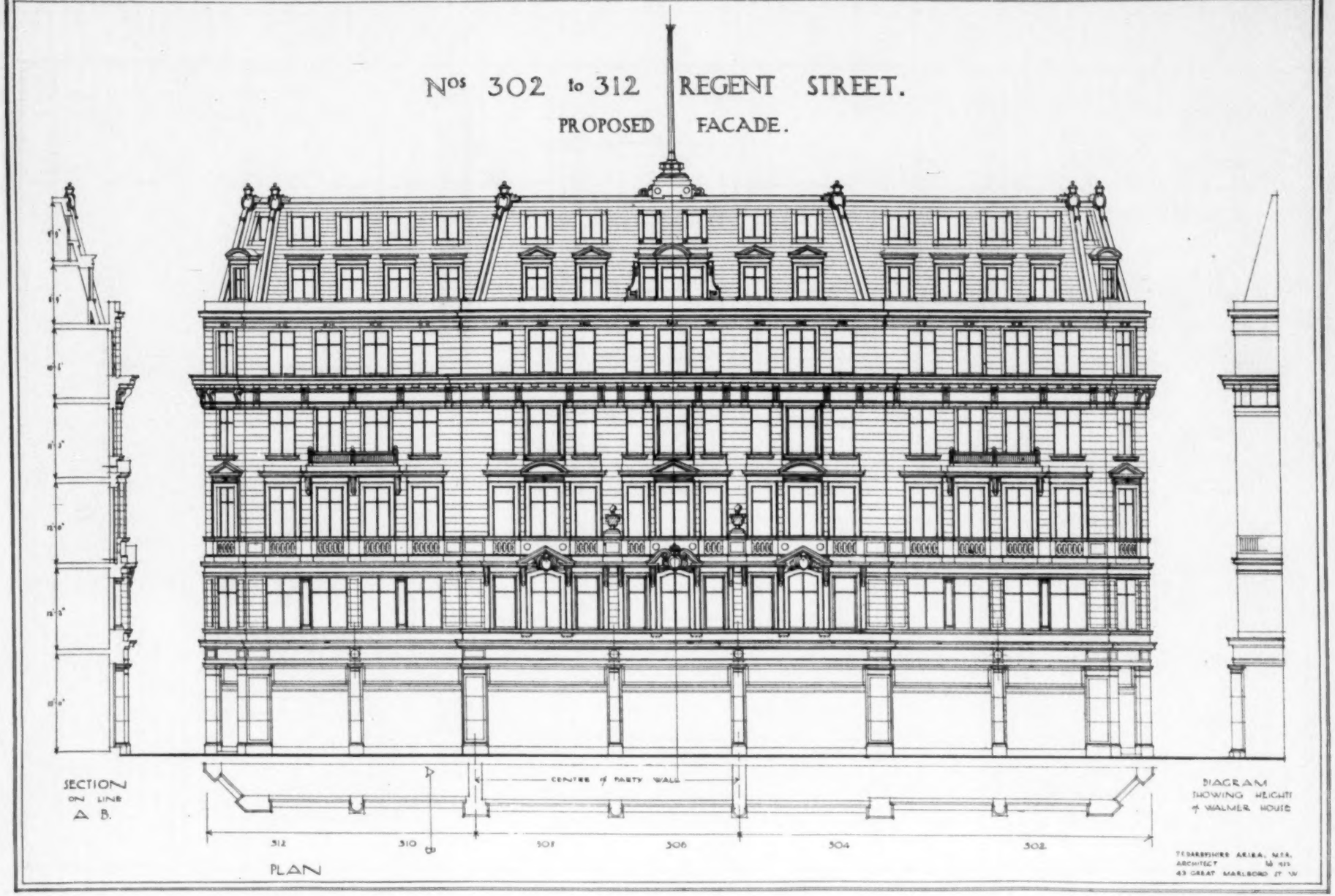
At University College, University of London, in the Bartlett School of Architecture, under the direction of Professor A. C. Richardson, F.R.I.B.A., the Degree, Diploma, and Certificate Courses in architecture are arranged to provide students with training approved by the Board of Architectural Education of the Royal Institute of British Architects. Exemption from its Intermediate Examination is granted by the Royal Institute to students who receive a First Class College Certificate, and from its Final Examination (qualifying as Associate R.I.B.A.) in all subjects except Professional Practice, to students who obtain the Degree or Diploma. The Degree Course enables students to continue their general studies up to the level of the Intermediate Examination of the University concurrently with commencing their professional training.

Although it has no specific architectural or building course, the Northampton Polytechnic Institute, Clerkenwell, gives considerable attention to engineering subjects, and its lecture courses include applied mathematics, strength and elasticity of material, engineering materials, hydraulics, structural engineering, surveying, and electrical engineering.

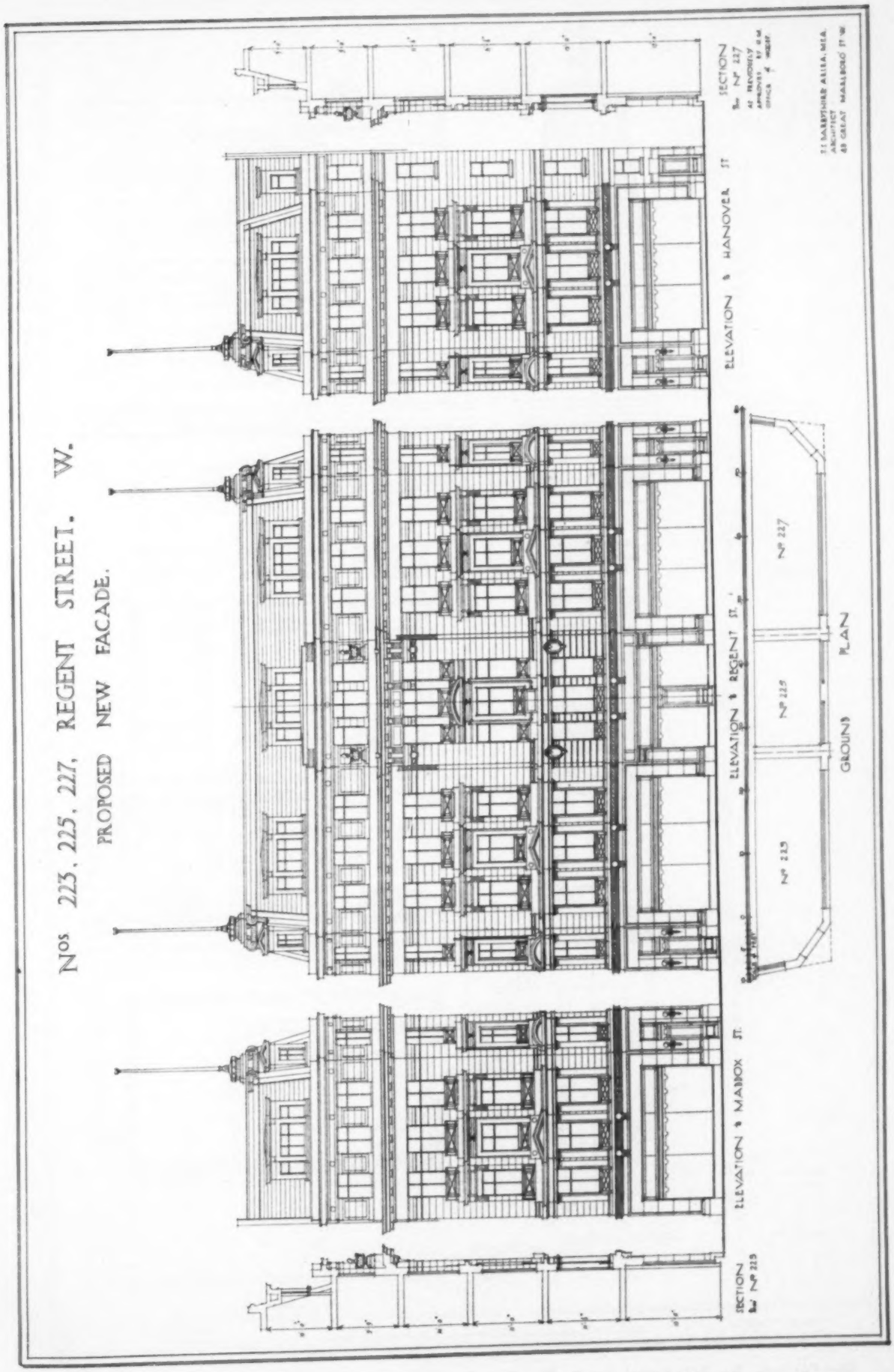
The London County Council Westminster Technical Institute (Vincent-square, S.W. 1) offers a comprehensive syllabus relating to civil engineering and building construction, and the subjects of the evening courses include technical drawing, engineering mathematics, engineering drawing and design, applied mechanics and graphics, structural engineering, surveying and levelling, surveying field work, hydraulics, reinforced concrete design, steel frame buildings, and specifications and quantities.



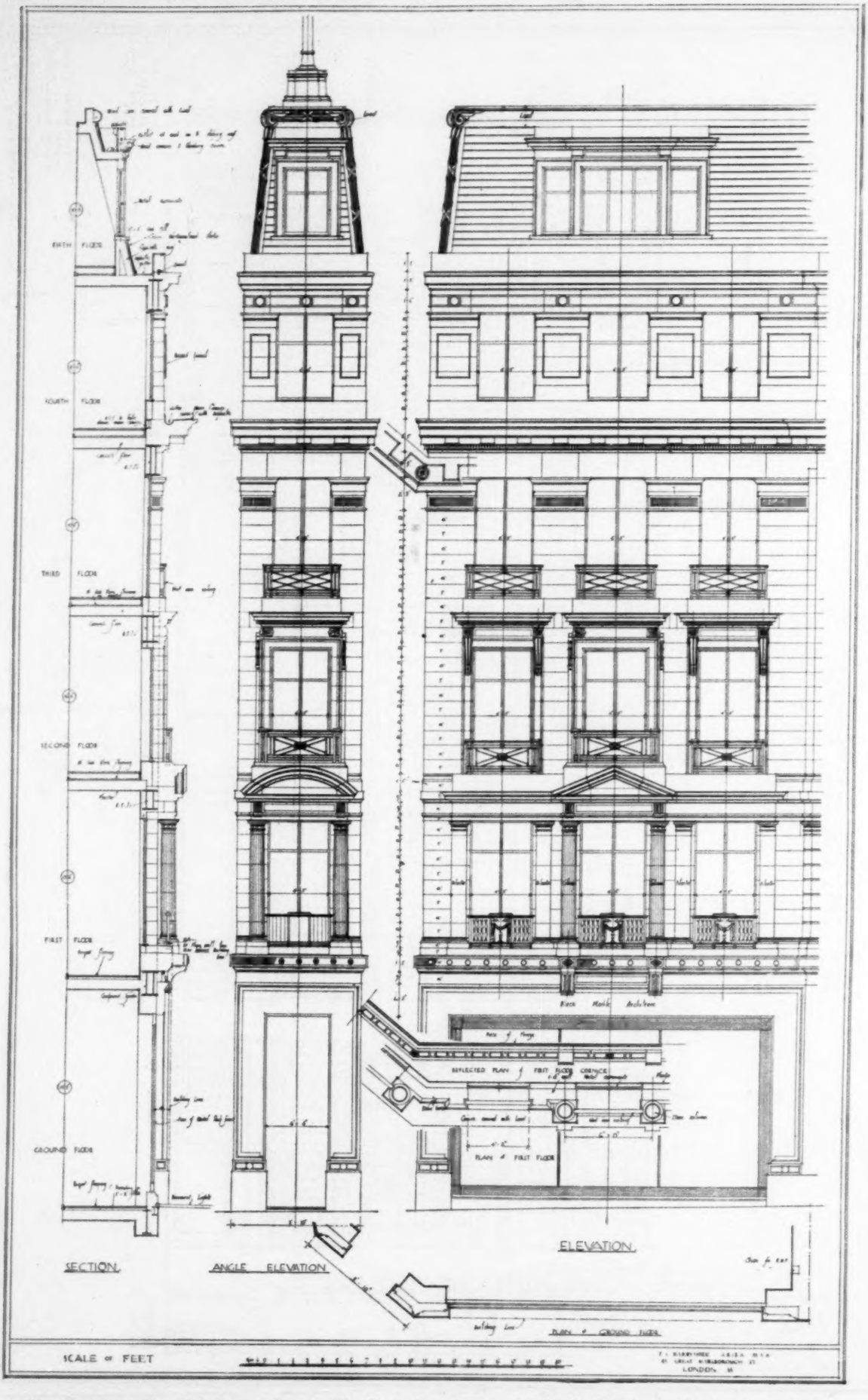
New Premises, 189–191, Regent Street. MR. T. S. DARBYSHIRE, A.R.I.B.A., M.S.A., Architect. (*See p.* 448.)



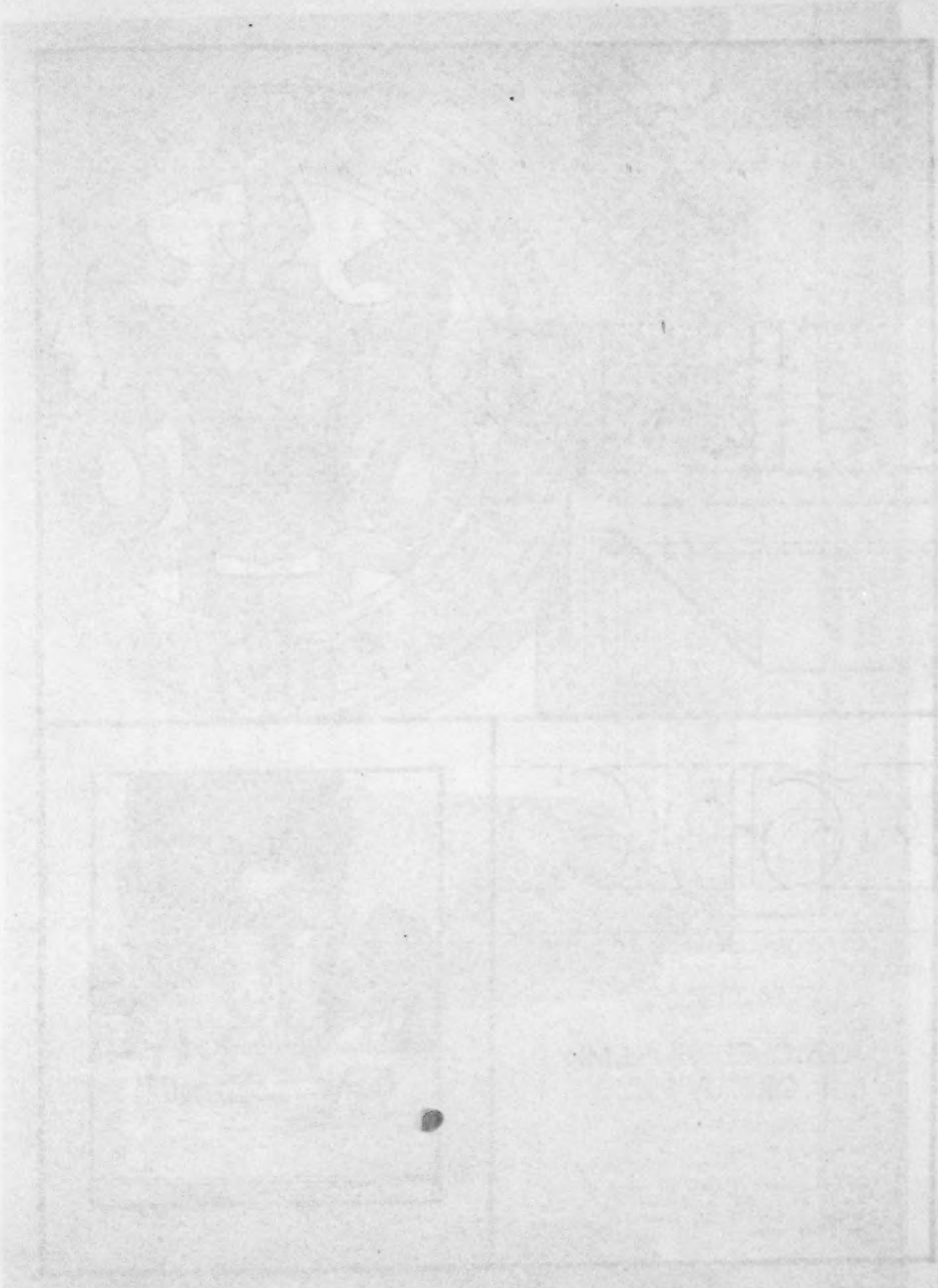
New Premises in Regent Street. Mr. T. S. Darbyshire, A.R.I.B.A., M.S.A., Architect. (*See p.* **448**.)



New Premises in Regent Street. Mr. T. S. Darbyshire, A.R.I.B.A., M.S.A., Architect. (*See p.* 448.)



New Premises, No. 223, Regent Street. MR. T. S. DARBYSHIRE, A.R.I.B.A., M.S.A., Architect. (*See p. 448.*)



Ipswich War Memorial

Sketch Details of Enrichment
½ Full Size

4

The Arms of the County Borough of Ipswich

THE

Detail of Main Inscription ½ Full Size

Obelisk Inscription :—

"To the glorious memory of the brave men of Ipswich who offered their sacrifice in the Great War"

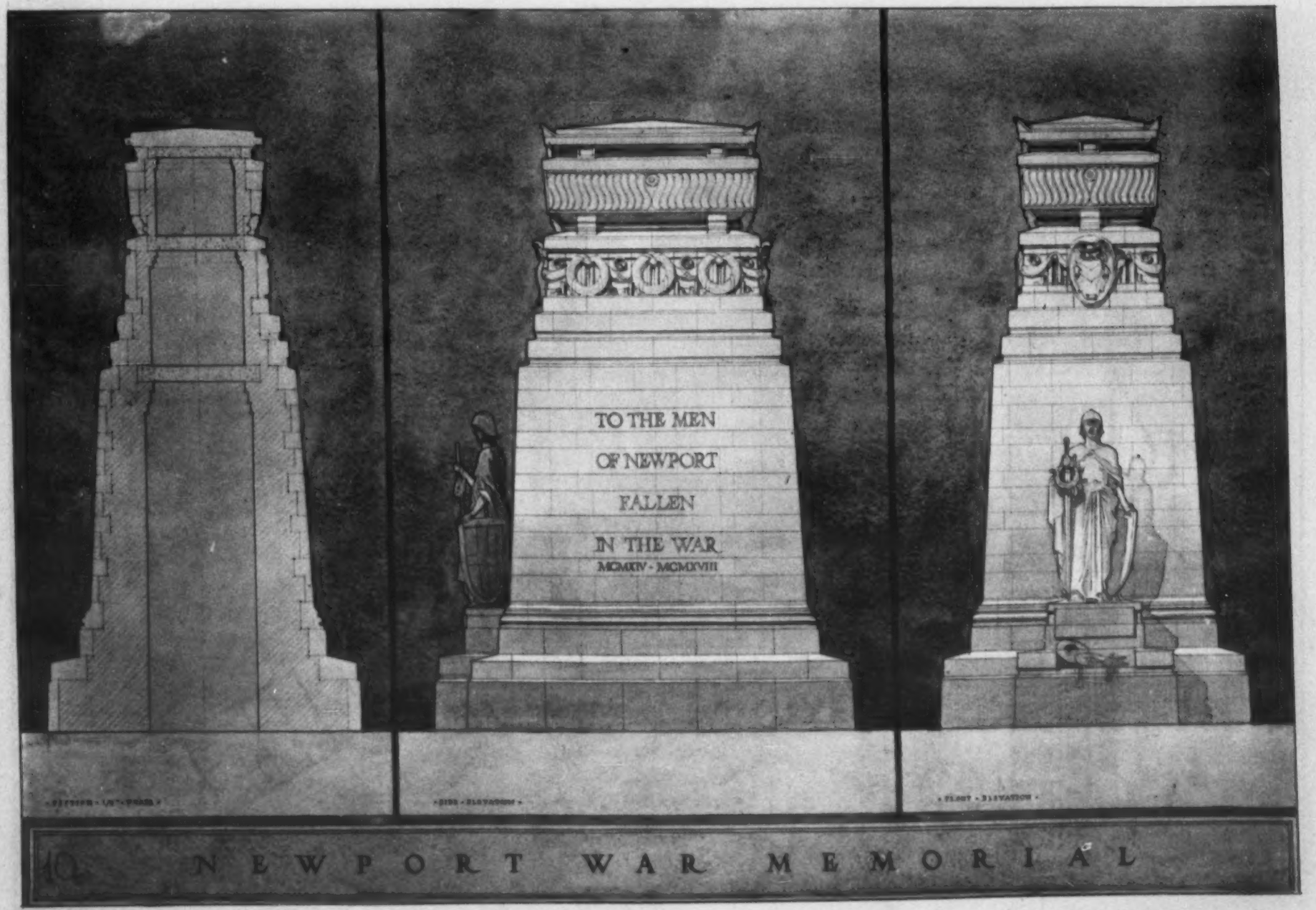
A. B. C D E F G H I J K L M N.
O. P. Q R S T U V W X Y.

Full Size Detail of Lettering for Names inscribed on Holbon Wood Stone.

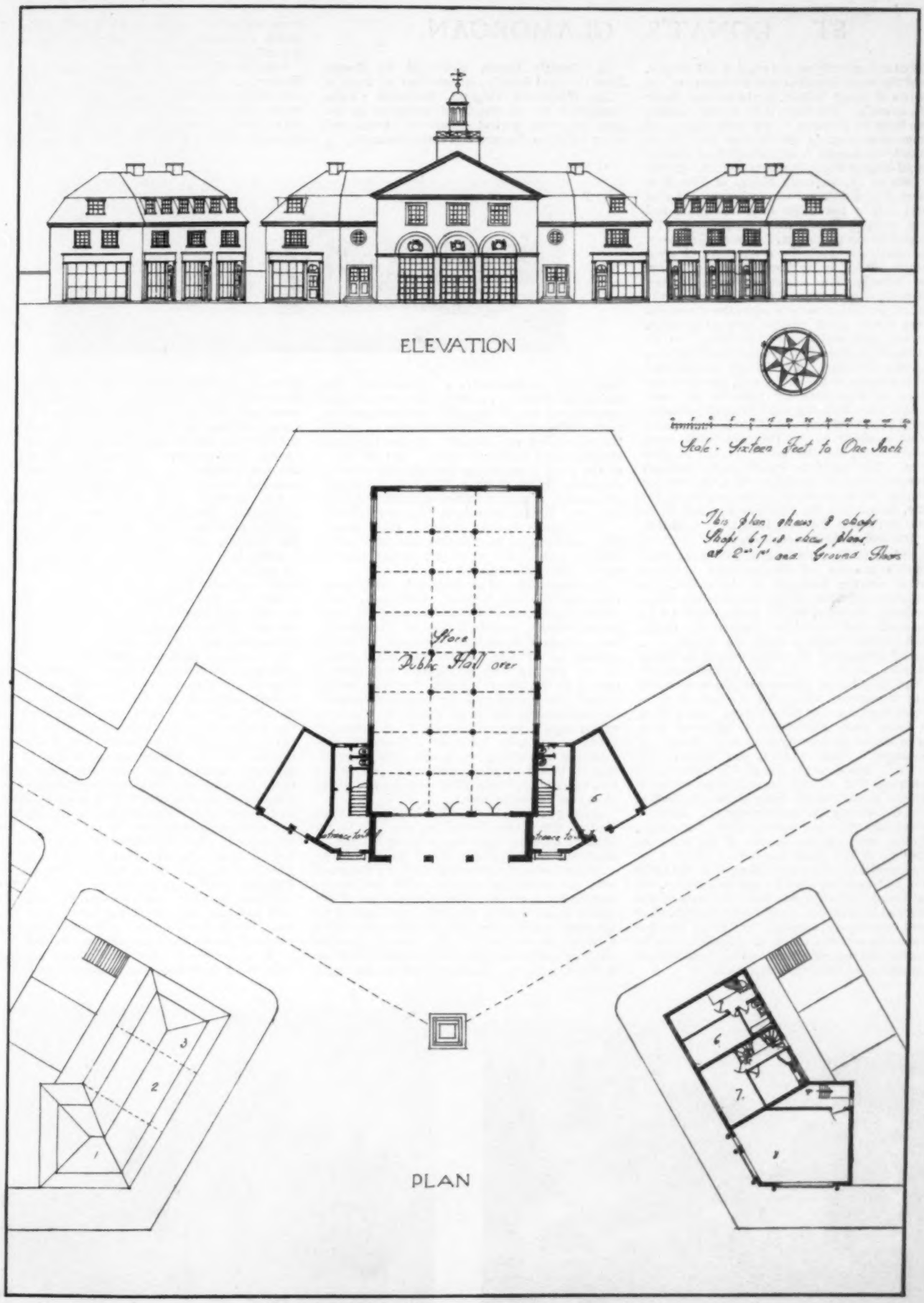
The Names are shown in 38 columns each containing 42 names giving a total of 1596 or 1400 with names of Regiments additional. A width of 7" is allowed to each column with 2½ space between.

PERSPECTIVE SKETCH

MR. C. T. ARMSTRONG, A.R.I.B.A., ARCHITECT.



SECOND PREMIATED DESIGN, BY MESSRS. V. O. REES & V. WARE, AA.R.I.B.A.



Proposed Development of Shopping Area at Throckley.

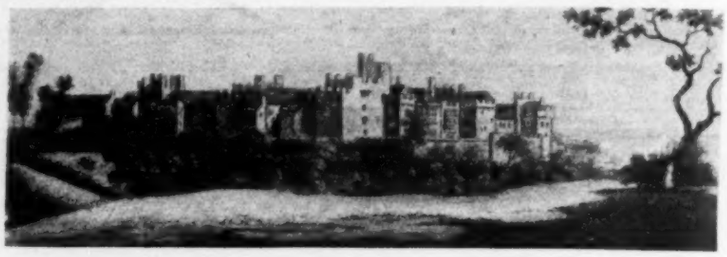
MESSRS. ADSHEAD & RAMSEY (London), and MESSRS. HARVEY & WICKS (Birmingham), Associated Architects. (*See p. 448.*)

ST. DONAT'S, GLAMORGAN.

SITUATED serenely on the coast of Glamorgan, one of the most beautiful and interesting of the counties of Great Britain, is the ancient Castle of St. Donat's. The Town of St. Donat's (taking name from St. Donatus, a very early bishop and martyr celebrated in the Roman and Church Calendar on August 7, or perhaps from another sainted bishop whose day is kept in the Church on October 22, an early bishop of Fiesole in Tuscany) is situate on the rocky shore, facing south, only a few miles from Bridgend, and about equally distant from Cambridge, with Llandaff to the north-east, fourteen miles away. The castle was originally a structure of great strength from a military point of view. The Fitz-Hamons, whose successes in the "Winning of Glamorgan" changed for ever the political position of that county as the stronghold of the native Welsh against Norman invasion, bestowed the district or "lordship" on his companion-in-arms, Sire William Le Esterling, otherwise Stradling. The latter's descendants held possession of the castle, and, therefore, the barony or dominium for upwards of seven hundred years, building, and adding to buildings, until it became of very considerable importance, having a claim to be reckoned with when troubles darkened the tenure of the English crown. The last of the Stradlings, Sir Edward, a baronet, died at Montpelier in 1738, and the lordship, visibly signified by the holding of the castle, passed to a Mr. Fontaine Tyrwhit, afterwards to Thomas Tyrwhitt Drake, who held it in the first half of the last century.

The late G. G. Francis, who collected a considerable amount of documentary evidence bearing on the fortunes of the castle, the pecuniary difficulties of Sir Edward and Dame Elizabeth, his wife, whose jewels were to be alienated, and the late George T. Clark, F.S.A., whose *magnum opus*, the *Cartae . . . quae ad Dominium de Glamorgancia pertinent*, 2nd edit., 1910, 6 vols., 4°, is indispensable to the historian of Glamorgan, have recorded many documents which tell the tale of vicissitudes touching this historic pile. From Clark we learn that Fitz-Hamon's followers were drawn almost exclusively from the "Honour of Gloucester." This warrior, the victor, died in 1107. No accurate list of his followers is preserved, but among them Hawey probably held St. Donat's as his share in the distribution of land following his leader's victory. Hawey's heiress brought the lordship to the Stradlings, together with the castle, one of the most interesting of the whole number of about forty strongholds, of which five belonged to the Chief Lord and were intended for general defence, the cost being, according to Clark, the seats of the principal landowners. Curiously enough, they stood very closely together, for taking Wenvoe as a centre within a radius of six miles could be counted fourteen or fifteen castles, each held by a family of at least knightly rank.

"St. Donat's Castle, now sold by Messrs. John D. Wood and Co., is described by them as "The Historical, Original, Mediæval Castle, considered one of the finest examples in the kingdom, with perfect gatehouse, inner and outer buildings, towers, and embattlements . . . thoroughly modernised . . . containing fine period decorations . . . overlooking and reaching down to the sea, in beautiful terraced gardens, quite remote from all industrial areas . . . with three hundred and seventy or one thousand three hundred and forty acres." An old view, of the final years of the seventeenth century, shows the Watch Tower and an adjacent chapel or cottage, detached from the main buildings and even at that date in a ruinous condition.



This Watch Tower, so-called, stood nearly fifty feet high, on the western side of a pretty wooded glen, chine or dingle, on the edge of which the castle stands.

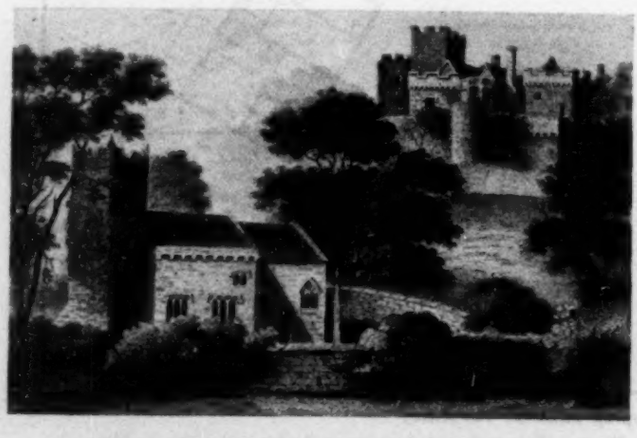
The ground plan of the fortress is nearly quadrangular, and the interior apartments, when Cliffe described them in the middle of the nineteenth century, were in a state of dilapidation, but contained some fine examples of woodcarving by Grinling Gibbons and other artists of his period; one well-known mantelpiece, carved by the master's hands, had been nearly carried away piecemeal by curiosity hunters. Terraces led to the shore below, to which in earlier days a covered way led to an extensive series of barracks for men and horses, surrounding an oblong enclosure, two acres in extent, walled on three sides and open to the sea, which at high tides often dashes over, to the injury of the outer wall.

Among views of a somewhat later period than that of the Watch Tower, we are able to reproduce a copper-plate engraving or etching by Sparrow, dated April 27, 1774. This shows the exterior face of the principal entrance, furnished with its portcullis, enriched with embrasure, machicolated cornice, after the fashions of the times, lancet-headed windows, and flanked on the right and left sides with low embattled walls, behind the left one of which stands another building similar as to its details to the style of the towered gateway. Farther back on the right, more embattled walls, a graduated gable of Dutch appearance and an early door beside a mounting block, are shown.

Another old view, drawn and engraved by S. Hooper, a well-known topographical artist, and dated November 30, 1775, is taken from a greater distance, and reproduces a very charming *coup d'œil* of the whole pile of buildings, showing the extensive and somewhat complicated ensemble, which would be difficult to follow now in all its details, for the restorer has been busy at work in several places. What is seen, however, points to the great strength of the buildings and the ample security they offered against the invader. Over the gate leading to the quadrangle is a shield charged with the armorial bearings of the Stradling family.

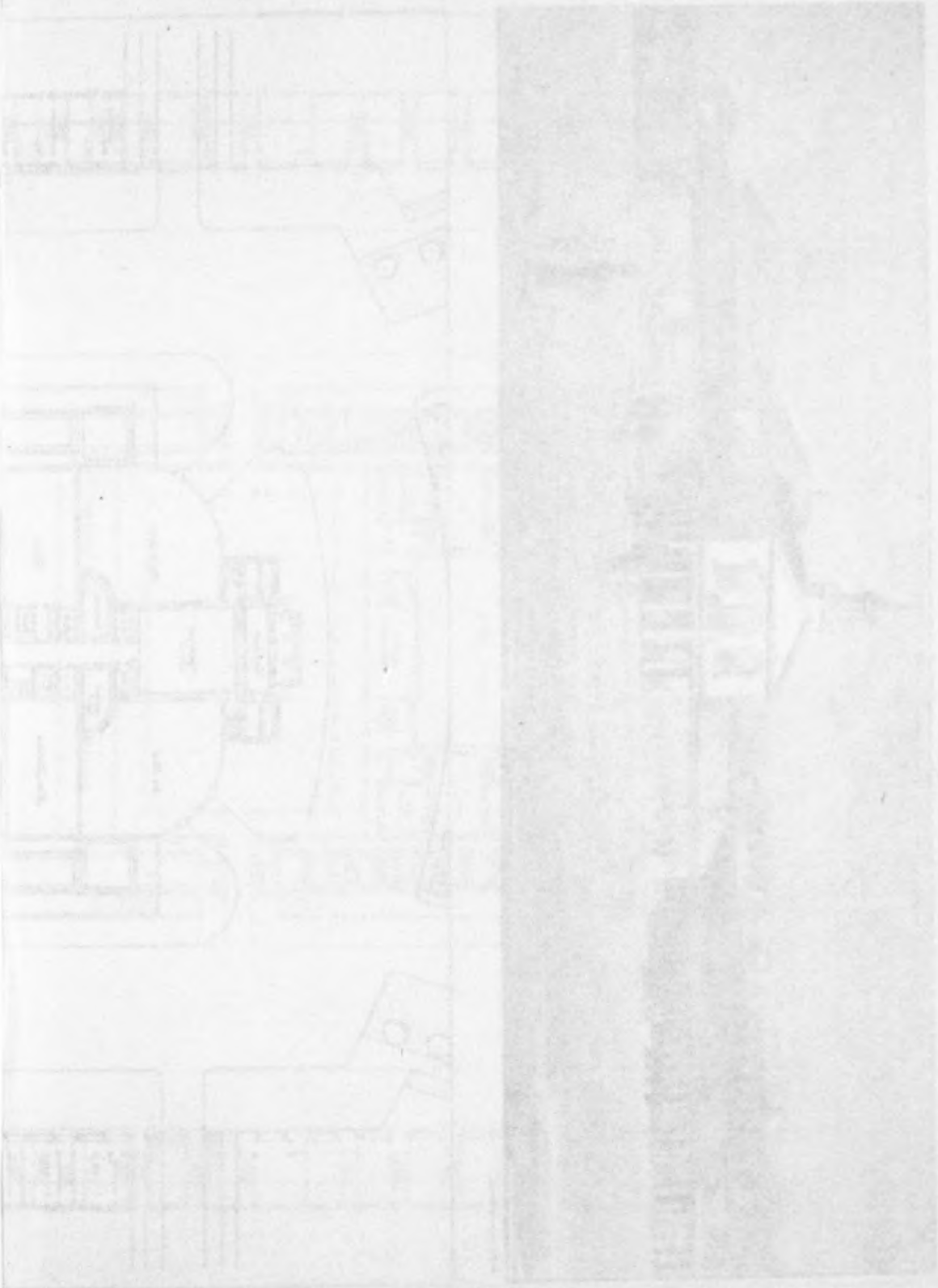
Yet another very interesting engraving, apparently of the eighteenth century, shows the relative positions of the church and the castle. The church, with sixteenth-century windows inserted into the outer wall of the south aisle, its earlier windows in the chancel, its massive tower battering in its lower courses as was the custom in South Wales in order the better to withstand sudden rushes of marauders from the hills of mid-Wales, and the castle, with its rectangular keep, circular bastion to its wall and late windows adorned with flattened hood-mouldings to match the insert windows of the church, combine to make a very instructive representation of the ancient buildings where the cleric and the knight trod the grounds in the mediæval ages. A beautiful cross adorns the southern side of the churchyard, and in the interior of the edifice are paintings of the fifteenth century, and some handsome sepulchral monuments commemorating some of the members of the family of Stradling are contained in a small chapel belonging to the occupants of the castle; among these is an "elegant sarcophagus of white marble to the memory of the last of that line, who died abroad." In Mr. Clark's time, that writer tells us, this historic building was in the possession of Mr. Morgan Williams, who has "most successfully renovated and restored it." It is the latest and most complete of the structures built for defence, and contains ample domestic accommodation.

[It is announced that St. Donat's has been sold to an American now resident in Berlin.]

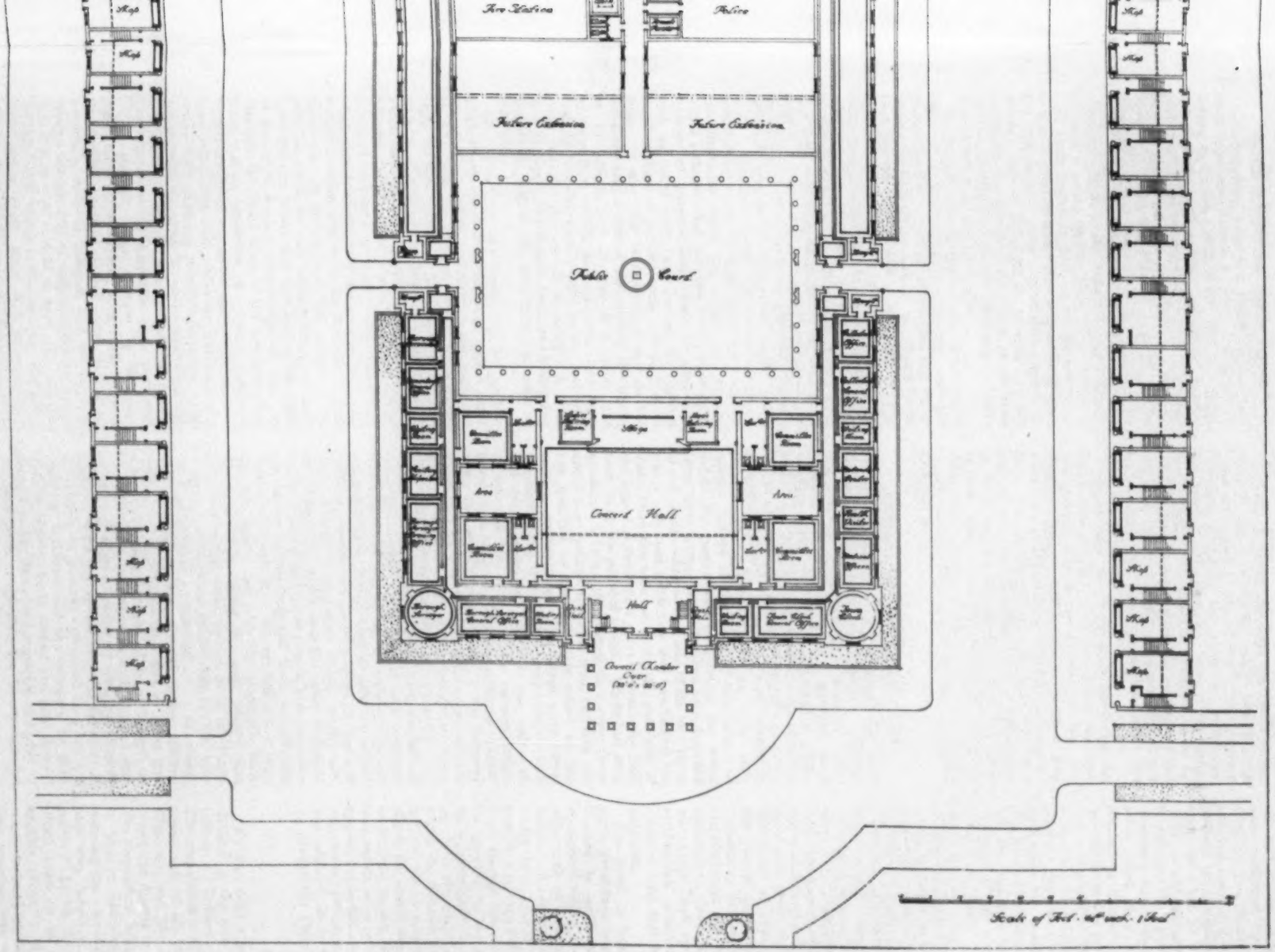


St. Donat's Castle and Church, Glamorganshire

St. Donat's Castle. (From an etching by Sparrow—1774.)

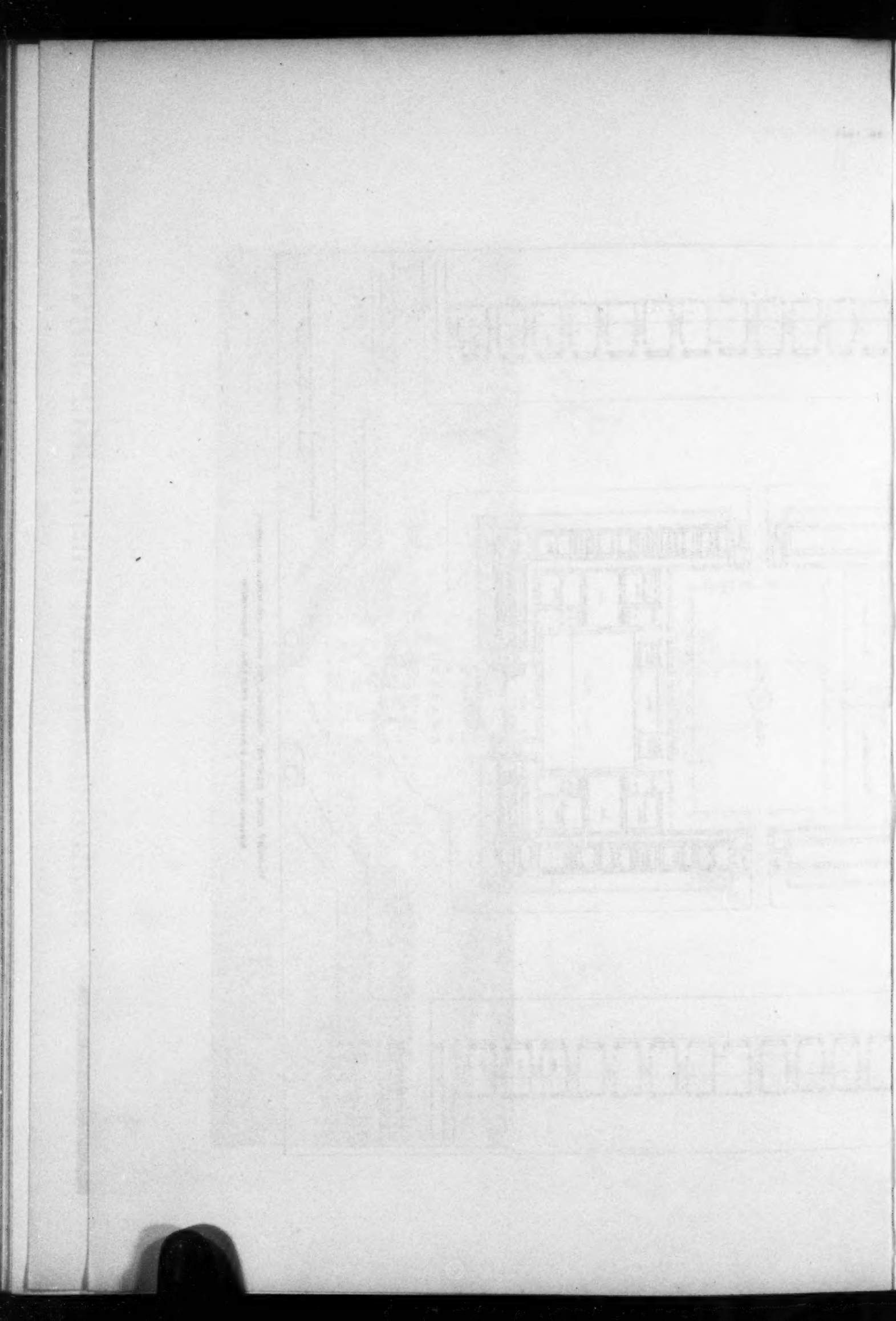


R.A. EXHIBITION.



TILBURY CIVIC CENTRE: PROPOSAL FOR SHOPS AND PUBLIC BUILDINGS.

MESSRS. ADSHEAD & RAMSEY, FF.R.I.B.A., ARCHITECTS.



LEGAL SECTION.

NOTES ON CURRENT CASES.

Specific Performance—Latent Defect.

An interesting point was raised in two cases tried together—Yandle & Sons *v.* Sutton and Young *v.* Sutton (1922, 2 Ch. 199)—in which the plaintiffs were seeking a decree of specific performance and damages against the defendant on a contract for the purchase of land. On March 30, 1921, the plaintiff Young had in writing agreed to sell a field of his own and, acting as agent for the other plaintiff, a plantation adjoining it, to the defendant who intended to build a house on the plots. The contracts were open contracts, and, as we showed in an article on June 30 last, where a contract is open the obligation to make a good title implied by the law may be rebutted by proving that the purchaser was aware of the defect at the time he entered into the contract (McGrory *v.* Alderdale Estate Co., (918, A.C. 503).

In the case we are considering there was a right of way across both the field and the plantation, but it was an unmetalled and somewhat irregular track, and, as the Court found that the existence of this public right of way had not been expressly pointed out to the defendant, the question to be determined was whether there was such a physical indication of the existence of a public right of way over the field and plantation as to amount to a patent defect—that is, a defect obvious to the purchaser at the time of his purchase, for if a defect is obvious the rule *caveat emptor* would apply. The Court found that there was a fairly well defined track through both the field and the plantation which was visible, and such as would indicate that the track was used by a number of persons from time to time but such as could have been formed by quite a small number of persons using it from time to time. It may also be mentioned that on the ordnance map a dotted line showed the track; at the south end of the field there was a stone stile which, at any rate, had been seen by the defendant's wife, as she had with some difficulty got over it, it being 2 ft. 6 in. to 3 ft. high and although there was a stepping stone 6 in. high at one side, there was none on the other.

On these facts the Court had to consider whether the physical existence of such a track was a patent defect indicating to the purchaser that he was buying land subject to a public right of way, and it is important to observe that the Court pointed out that the path or track, in itself, is no defect at all as it may have been formed merely by those in the employ of the owner of the land; the defect is that which may be implied from the existence of the track, *i.e.*, a right in other persons to use the land. This right may be patent from the nature of the path or track, so that anyone seeing it must draw the conclusion that there is a public right of way or, at least, a private right of way. In this case the Court came to the conclusion that there was no indication of either a public or a private right of way as the whole circumstances were compatible with either the existence of a public right of way, a private right of way, or an accommodation track for use in connection with the property and the actions claiming specific performance of the contracts were dismissed.

The learned Judge referred to the case, Ashburner *v.* Sewell (1891, 3 Ch. 405), a case in which the question raised was whether the purchaser under a contract had the right to rescind the contract or only to claim compensation in respect of a right of way. In that case the road over which it subsequently transpired there was a public right of way was actually marked by dotted lines on the plan attached to the contract, but it was admitted by both vendor and purchaser that it was a latent defect for neither of them knew that the road thus indicated was a public right of way and the purchaser was held entitled to rescind under the contract.

It may be noted also that the Court in the case we are considering made this general observation that as the vendor is in a position to know all about the property, whilst the purchaser is in the dark, any defect to be patent must be one which arises to the eye or must be implied from something visible to the eye and not such rights as might have been found out had inquiry been based upon that which was presented to the eye.

This is only an observation made by the Judge and not part of the decision in the case, and possibly it might be strained too far. We think purchasers will be well advised, if they desire to avoid litigation, to make some inquiry; thus, if a dotted line on the plan indicates a road of some sort the wise course would appear to be to inquire into the nature of that road. In this case, as actually decided by the Court, there was no such indication as this, except on the ordnance map, but only a track consistent with private user.

Highways Act: Diversion of Water.

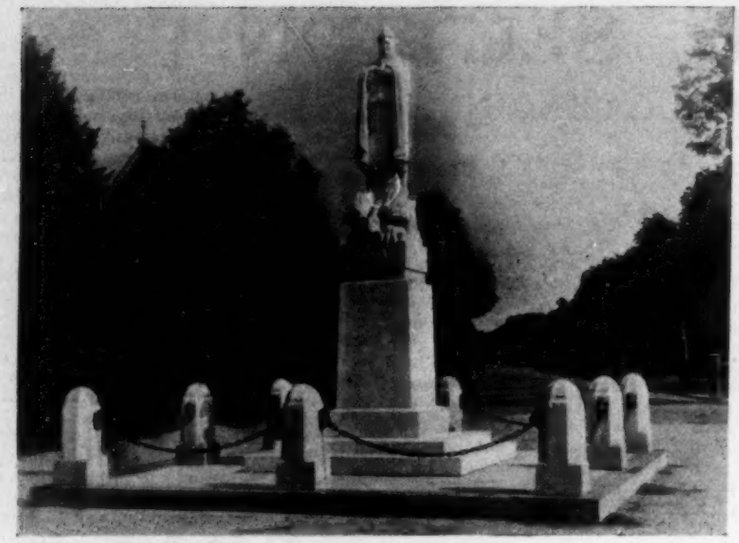
A point of interest to landowners has been decided in the recent case, Thomas *v.* Gower Rural District Council (1922, 2 K.B. 76). The plaintiff was the owner and occupier of a dwelling house with land adjoining a public highway. On the opposite side of the highway and at a higher level than the plaintiff's property and the highway there is a lane known as Grace's-lane. There appear to have been certain springs at the head of this lane, and before the proceedings in question the water from these springs seems to have been disposed of as follows:—At the west side of the lane there was a well, and when this well overflowed the water from the well ran down the west side of the lane and through a culvert under the high road on to the plaintiff's land. There had been questions between the parties in former times about this overflow from the well, but they are not material to the questions raised in this action. Before these proceedings were taken the discharge of this surplus water from the well had been acquiesced in, but the water in question in this case was the springs which flowed in a naturally formed groove or channel down the middle of the lane to the highway where they were carried by a culvert into another lane, Quarter Shwood, which was on the same side of the road as the plaintiff's property. Up to October, 1920, none of this spring and surface water had found its way into the well or helped to increase the volume of the overflow on the plaintiff's land, but in that month the Urban District Council had placed a ridge of clay and stone across Grace's-lane which, whilst not obstructing the traffic, had the effect of diverting the whole of the water (which had run down the centre of the lane and been carried into Quarter Shwood) into the surplus water from the well which ran over the plaintiff's land. The Council, in taking this step, alleged that they were acting under section 67 of the Highways Act, 1835, which enacts that the Surveyor of Highways is empowered . . . "to make, scour, cleanse, and keep open all ditches, gutters, drains or watercourses, and also to make and lay such trunks, tunnels, plats or bridges as he shall deem necessary in and through any lands or grounds adjoining or lying near to any highway upon paying the owner or occupier of such lands or grounds—provided they are not waste or common—for the damages he shall sustain thereby, to be settled and paid in such manner as the damages for getting materials in enclosed lands or grounds are herein directed to be settled or paid."

It will be remembered that by section 35 of the Local Government Act, 1894, the Rural District Councils were constituted highway authorities. It was contended by the defendant Council that what they had done had been to make a gutter or watercourse, and that in sending the water from Grace's-lane down that watercourse into the stream which flowed from the well and so on to the plaintiff's land, they were protected by the terms of the above section. The Court found that the defendants had not made a gutter or watercourse in and through lands adjoining or lying near the highway, but what, in fact, they had done was to divert a large quantity of water which formerly flowed over the highway and then down Quarter Shwood so that it should pour over the plaintiff's land, which they had no power to do. In coming to this conclusion the Court cited a passage from the judgment delivered in Croysdale *v.* Sunbury-on-Thames Urban Council (1898, 2 Ch. 515) on section 67 of the Act: "That section, however widely it be construed, only authorises the making and keeping open of ditches and drains in and through lands adjoining the highway, and does not authorise the discharge of the contents of any ditch or drain upon such land." A point of practice was raised in this case which we may note very briefly. The plaintiffs contended that a defence based on the Highways Act was a "statutory defence"—that is, a defence of which, under the rules of court, notice should have been given, whilst the defendants contended that a "statutory defence" was only one created specially by statute such as the Statute of Frauds or the Statute of Limitations. The Court, however, held that this defence under the Highways Act was a statutory defence of which notice should have been given under the County Court rules. We cannot in these pages attempt to enter into the general question of what will constitute a "statutory defence," but under this section of the Highways Act the defence is specific and amounts to this: that there is no remedy at all except that specifically provided by the section—an assessment of damage by the Justices—and this is a very drastic statutory provision.

The court in this case also considered the right procedure where notice of a statutory defence is omitted. The plaintiff's counsel contended either the case should have been adjourned on terms, or consideration of the defence should have been excluded, but the Court held that it was difficult to conceive a case in which the defendant should be precluded from raising his statutory defence altogether, for hardship to the plaintiff can be avoided by an adjournment on terms. There are cases, of which the Court indicated this was one, in which the defence being raised there should be no element of surprise to the plaintiff and in which the Court can deal with the matter. It is needless to say this point as to the defence was raised as a preliminary objection on the appeal, for in the result the plaintiff succeeded, and the injunction granted by the County Court was affirmed, so in the event the plaintiff had no ground for objection

Rating.

We may note a point in rating law recently decided in the case Norwich Assessment Committee *v.* Pointer (*Weekly Notes*, July 29). The respondent in the case appealed against the assessment of his property at £150 gross and £125 net, and the Assessment Committee reduced the figures to £93 and £72 respectively. The respondent being still dissatisfied appealed to Quarter Sessions, who allowed the appeal, reducing the amounts to £72 and £41 10s. A case was, however, stated on the following points:—At the hearing the respondent tendered evidence as to the rateable value of another property of similar character in the neighbourhood which was rated lower, and the first question was whether this evidence had been rightly admitted. The second question was whether the Recorder had acted rightly in disregarding the estimated cost of the construction of the respondent's buildings, evidence of which had been given by the appellants.



Bedford War Memorial.

MR. GEORGE P. ALLEN, F.R.I.B.A., Architect; MR. C. S. JAGGER, Sculptor.

This latter question was not pressed before the Divisional Court, but was revived in the appeal to the Court of Appeal, and both questions were answered in the affirmative.

The first question is the most important. The appellants contended that the two premises could not be compared, and that, in any case, the evidence could not be admitted because no notice had been given to the persons rated in respect of the other premises under section 18 of the Union Assessment Act Committee Act, 1862.

This latter objection was disposed of on the ground that here the respondent was not seeking to have the assessment of the neighbouring property raised, but only using it as a standard from which the rent his own premises might be expected to let for might be arrived at; far from attacking the assessment of that other property he was contending it was correct and formed the right basis for the assessment of his own property. That disposed of the point as to notice, and the Court also held that the evidence was admissible when the tribunal was satisfied that there was such a resemblance between the two properties as to make the comparison helpful. The Lord Chief Justice intimated that he hoped nothing said in this judgment would lead to a multiplication of this kind of evidence. We are quoting from the decision of the Divisional Court, as at present the judgments delivered in the Court of Appeal are not reported, but only the fact that the judgment of the Divisional Court had been affirmed.

UNEMPLOYMENT DOLES.

WE recently pointed out, in an article on the Trade Union Congress, some of the objections to any scheme which would make the receipt of unemployment pay dependent on work, although all such schemes are extremely attractive. We notice that at the recent meeting of Wm. Beardmore & Co., Lord Invernairn of Strathnairn, referred to this question. He spoke of the pernicious policy of giving something for nothing in this connection, as unemployment doles destroy morale and cut at the very root of business practice, and he went on to suggest that the view recently expressed by a leading industrialist, namely, that some portion of the sums expended annually on unemployment should be paid as a subsidy to companies whose plant is standing idle, to enable those firms to undertake contracts and employ men on productive work, had much to commend it. It must be admitted that any such scheme would be not only attractive but would have practical advantages, but how can it be put into effect? During the war we were shown the evils of any system of subsidies, and considerable difficulty has been experienced in eliminating them, but apart from this how could any selection be made of firms even though they could use the subsidy to good effect in directly reducing unemployment? Even were this possible, on what practical principle could the firms be selected? The fact that the firm was engaged on reproductive work would not alone suffice, for this would embrace an enormous class and some further selection would have to be made. In such times as these most firms could increase their output if subsidised, and a general subsidisation of all industrial firms might be claimed. Unless the subsidy were universal there would be complaints that certain firms were receiving preferential treatment and the balance of industry would be upset.

Suggestions from such a source are worthy of careful consideration, but attractive as the scheme may be, it is, we fear, wholly impracticable, for the above and many other reasons.

BEDFORD WAR MEMORIAL.

The memorial, illustrated on this page consists of a figure of Justice on a pedestal and steps carried out in white marble, and the sculptor, Mr. C. S. Jagger, makes the principal feature of his design the figure, beneath the feet of which lies the emblem of Evil, the Dragon. The figure itself is crowned with a wreath of laurels, the emblem of Victory, whilst the scales are held by a dove, the sign of Peace, and decorated with the figure of a lamb suggesting Justice tempered with Mercy.

The surround of the memorial is a stone platform with piers carried out in Portland stone and bronze lions' heads and chains. The height from the pavement level to the top of the memorial is about 17 ft.

Mr. George P. Allen, F.R.I.B.A., was the architect for the architectural work and the layout of the memorial, the contractor for the foundations being Mr. Laughton, of Bedford.

Royal Fusiliers' Memorial.

The war memorial of the Royal Fusiliers (City of London Regiment) will be unveiled by the Lord Mayor, and dedicated by the Bishop of London, at Holborn Bars, on Saturday, November 4. The memorial, which is mounted on a stone pedestal, is a bronze statue by Mr. Alfred Toft of a private of the Royal Fusiliers in full equipment, with rifle and fixed bayonet.

BOOK REVIEW.

Steam Heating: A Practical Treatise. By FREDERICK W. DYE (Consulting Engineer, M.Inst. H. and V.E.). London: E. & F. N. Spon, Ltd., 57, Haymarket, S.W. 1. 1922. Price 8s. 6d. net.

Steam heating has the two great advantages of obtaining results with the minimum of delay after firing up and that a well-designed system of steam pipes clears itself of water when cold, and is therefore practically exempt from danger of accidental injury through frost. In his practical treatise on this subject Mr. Frederick W. Dye describes the several modern methods of installation practised in this country and in the United States of America, where steam heating is used in residence work to a much greater extent than with us.

The old objection to steam heating, that the heat had either to be full on or completely shut off has been obviated in some of the low pressure vapour and vacuum systems which admit of regulation of the temperature, and these special installations should be given full consideration particularly for domestic work. The theory of the subject is gone into at some length, as it is of the greatest importance that the work should be done in accordance with the physical laws governing the action of steam in a process of condensation. When steam and water come into conflict the result is "noise and strain—water-hammer as it is called. . . . Water, it must be understood, is practically incompressible, even more so than iron; and if water is projected sharply into a vacant space it can deliver a blow like an equal mass of metal. There are a number of instances of water-hammer in steam pipes causing a burst—usually at a brass valve if there is one, this being weaker than the wrought tube or fittings; and a case was read of in which part of a valve killed a man which it struck." The danger of water-hammer is that it causes failure by exhausting the particles of the enclosing metal without the steam pressure in the boiler rising to any abnormal heights or affecting the gauge or the safety valve. Because the first blow is not disastrous repair or amendment in the pipe run is liable to be deferred, but neglected water-hammer is sure to have its effect in the long run, besides creating a most irritating nuisance by the noise accompanying its action,

Other defects, due to condense-water, loss of heat, the effects of hard water, are dealt with in a separate chapter. Priming, the escape of water from the boiler into the steam supply, is also discussed and the appropriate remedies are explained in detail. The successful warming of factories by means of overhead pipes is made clear in a few pages of text with the help of two diagrams, and, once it has been pointed out, it is clear that the action of steam pipes near the ceiling or of radiators near the floor both depend upon the circulation of the heated air. Of the two methods, the single horizontal pipes are the more efficient radiators. Figures are given for the loss of radiation effect when several pipes are grouped together, long vertical pipes having less effect per square foot of surface on the warming and circulation of the air than short verticals, horizontal pipes stimulating circulation most freely of all. The fact that stale air in motion regains some of the revivifying effect of freshness is utilised in the unit system of heating, where the radiator is enclosed in a metal case through which the "contained" partially vitiated air of the factory is propelled by means of an electric fan. The warmed air escapes again near the floor, from which it will rise by its own comparative lightness and cause circulation. Economy in steam is effected by this re-use of "contained" air as fewer thermal units are used than would be required to heat air admitted at a low temperature from outside, and by the use of an air inlet duct and damper in connection with the appliance, any desired proportion of fresh air and contained air may be forced through the radiator. Chapters on heating water by steam are included in the book with many useful tables and data and several admirably clear line diagrams of ideal pipe lines and details of fittings.

HEATING, LIGHTING, & VENTILATING.

PRESENT-DAY METHODS OF HEATING, LIGHTING AND COOKING.

BY AN ARCHITECT.

THE problem which confronts the architect to-day in advising his client as to the best means of equipping his dwelling for heating, lighting and cooking, is a far more vexing one than that which faced him a few years ago. Then, heating was by means of open coal fires, cooking and water supply from a kitchener, and lighting by means of electricity or gas, if available; otherwise, by means of oil lamps. Enormously increased efficiency is now obtained at the price of increased perplexity, and the architect has to consider each case carefully on its merits and requirements.

In the medium-sized town house, where all public services are available, lighting will be by means of electricity. Electricity may also be used as a means of heating rooms not constantly in use, such as the dining room and bedrooms, unless a system of central heating is installed; but it must be remembered that central heating is, on the whole, most useful in a country which experiences long spells of constantly cold weather; in England, for the most part, a system which enables heat to be generated quickly and cleanly, and as quickly extinguished, is more desirable. Cooking will be by means of electricity or gas, with a supplementary self-setting range for use in emergency. The hot-water supply will be by means of an independent coke-fired boiler, which may also usefully be made to heat a radiator or two in the passages. Although electricity, however, is to be recommended for heating and cooking, its cost may often render this course impossible. Gas performs the same services more cheaply, if slightly less conveniently. But gas is not regarded by some users as an economic means of heating rooms in constant use. A gas radiator consuming, say, 40 c. ft. per hour, from 8.30 a.m. till 11 p.m., with gas at 5s. per 1,000 c. ft., cannot be recommended as an economical proposition. The house, however, should be thoroughly carcassed for gas, so that a radiator can be installed in any room without expense, should it subsequently become desirable to do so. The heating of the main sitting room would be by an open fire of a slow combustion type. A radiator off the hot-water boiler might be recommended, so that the fire would not be required on those intermediate days with which the English climate is so favoured.

Now let us consider the requirements of a small town house, the inmates of which are absent during the day between breakfast and dinner. Lighting, again, would be electric, and the cooking by gas; but if the house were to be run with a small (or without any) domestic staff, the architect would do well to advise his client to purchase a fuel-less cooker. This enables the cooking to proceed automatically and without attention during the day, providing a ready-cooked meal in the evening with a very small expenditure of gas to provide the initial heat. The hot water supply might either be by a geyser for the bath and wash basin and a small gas heater for the sink, or by a circulating system fixed by a thermostat-controlled gas heater. The dining room and bedrooms would be heated by gas radiators. The living room would have an open coal fire and a small portable gas radiator, which would heat the room in the evening unless it were very cold, and so save using the fire when little heat was required.

A small two or three roomed flat requires again something different. Here, perhaps, it would be most convenient to install a single apparatus which would alternate between providing an open fire and cooking, and would constantly heat a small boiler to supply hot water. Such ranges are made either for a single room or to be fitted in a wall dividing two rooms, one of which is a kitchen and the other a living-room, the one fire showing in both rooms. A studio flat would need yet another arrangement. Here, where there is a big room to heat, an anthracite stove would be found convenient; this would burn night and day during the winter, the consumption being carefully regulated according to the weather. Cooking would be by means of a gas stove, and hot water for the bath would be from a geyser and for the sink from a small gas-heater. Any other heat would be by gas radiators, but it would probably be found that the anthracite stove would maintain the whole flat at a pleasant temperature.

So far we have only considered houses which are served with public supplies of electricity, gas and water. The absence of electricity does not greatly complicate the problem, for gas can be used for lighting, although it provides a less pleasant and less convenient illuminant; without gas, however, the question requires very careful consideration. If it can be afforded an electric light plant can be recommended, but it must be remembered that whereas heating and cooking can be done off the public service, this is almost always impossible from a private plant. A single radiator for a moderate-sized room may require 2½ kilowatts, whereas two kilowatts will provide all the power necessary to light a medium-sized house. Presuming, however, the house is to be lit by electricity, the problem is how best to heat, provide hot water and to cook. The ambition of many householders now is to dispense with burning soft coal, and yet to maintain, perhaps, one open fire of wood or peat in the main sitting-room. The alternatives for cooking are, therefore, anthracite or oil. An anthracite combination will cook and provide a hot-water circulating system, but if a really constant supply of hot water is wanted it may be better to install an independent coke boiler, which could also heat a few radiators; yet it would not be regarded as a central heating plant. Cooking might, however, be done by oil. There are now two classes of oil cookers. One burns oil through a wick, and the cookers have one to four burners, according to size; the other burns a gaseous mixture of oil-vapour and air under pressure, and is made with one or two burners. The burners of the latter kind are interchangeable with a copper reflector radiator and can thus be used to cook or heat. A few of these burners will provide a means of cooking and heating. The same principle may be used with a special type of portable geyser. It is thus possible to cook, heat, and provide hot water by oil. To rely entirely upon one means for all these services is, perhaps, not always desirable, and it might be better to install an independent coke boiler of a type which provides a hot plate, or even an oven, for the hot-water supply, and this will be found useful to supplement the oil-cooker. Such a boiler provides space for warming plates, for heating irons, and for boiling a kettle or saucepan. In a house where there is a possibility of the cooking service being subjected to any great strain it may be advisable to install an ordinary self-setting range for emergencies.

If electricity is not to be used for lighting, an entirely new set of alternatives arise. Let us consider a medium-sized house, without public gas or electricity, and in which it is not intended to install a special electric plant, on account of cost. An electric-light plant, as we have seen, will only supply light; a gas plant, however, will do more. It will provide a means of cooking, of heating, and of lighting, but here again the initial cost is heavy, and the frequent attention which even the simplest plant requires may seem by many too irksome to be undertaken. The advantages of an installation are great. Petrol gas is easily and cheaply generated, it yields a good light and provides warmth. It should not, any more than coal gas, be relied upon for the entire heating of a house, as the consumption of gas would be too great, but it affords a convenient means for occasional heat in dining rooms, bedrooms, and during the between seasons, and as the gas is vapourless the radiators are portable and can be carried from

From the *American Architect*.

Fireplace in a Cape Cod House. (An early attempt to improve a rudely-constructed fireplace.)

room to room and attached wherever there is a cock. Standard lamps are made on the same principle. It would be advisable to install a coke boiler for the hot water, and if it were of the type which provides slight cooking facilities the gas consumption would be further reduced. Another lighting method is by means of acetylene. The installation is cheaper than petrol-gas and requires less space. The light is of a particularly fine quality; indeed, it is purer light than that obtained from most other artificial sources, but there is a slight danger of unpleasant smells, although by exercising moderate care on an up-to-date plant there should be no occasion for this.

If no plant of any description is to be installed the lighting should still be considered in conjunction with the other services, although it may seem to lie outside the province of the architect's usual work. Oil lamps are now as obsolete for lighting as soft coal is for heating or cooking. Although they yield a beautiful soft light they are the cause of much labour and dirt and they are not altogether safe. There are now many different types of lamps available which burn petrol gas. Most of these lamps burn the gas under pressure, and for that reason make an unpleasant roar. The light is extremely bright, usually about 200 candle power. These lamps are safe, as far as being knocked over is concerned, since, unless standing vertically, they automatically go out. There is a similar lamp which burns petroleum under pressure. Such lamps, combined with a petroleum cooker and radiators, mean that the whole house can be run with the one fuel, which could also be used to heat a geyser, or a coke boiler could be used for the water and a few radiators, as already suggested. There is, however, another type of petrol lamp, which, although it does not give such a bright light (about 50 c.p.), is simpler in operation, does not roar, and since it gives off the vapour from a saturated porous stone, is absolutely safe under any conditions. A further advantage is that this lamp is obtainable in many different designs and fittings. The small country house could, therefore, equip itself with petrol lamps, an oil cooker, and a few oil radiators (these radiators need not be objects of ugliness, indeed they are modelled on the copper-reflector electric radiator), a coke boiler with an oven and hotplate, and a couple of radiators. Another alternative is to light with petrol, heat in a central position, say the main sitting room, with an anthracite stove, and cook on an anthracite combination which will also supply hot water.

In the cottage, as in the small flat, if no gas is available, cooking, warming the kitchen and the adjoining room, and heating the water can be done by a single grate with a centrally-placed fire; the water for the bath, if this is not required every day, can be obtained from the copper by means of an "injector," and lighting by means of some of the lamps already described.

Sufficient has now been said to show that the alternatives, even in general principle, are vast, but the makes of each kind of appliance vary, so that the general scheme, having been decided upon, the particular fitting must be selected with care, to ensure its being the one most suited to the particular needs of the case. If the selection is made with discrimination, efficiency in the house will increase, while the labour and cost of upkeep will be lessened.

DOMESTIC HOT WATER SUPPLY.

An adequate supply of hot water for various domestic purposes is now considered an essential in every house, and the prospective householder will make it the subject of one of his first investigations; for upon the means by which it is obtained depends both the labour and cost in the upkeep of his establishment. In few departments of household arrangements have there been more improvements in recent years than in the hot water supply, and the choice of means for obtaining it is now extensive and includes devices to meet every contingency.

The most primitive method of obtaining hot water is by means of a vessel suspended or placed upon an open fire, and this is the method still pursued in boiling a kettle of water. But it is inefficient and dirty. The kettle boils slowly and becomes covered with a thick black carbon deposit and the heat is wasted However even kettles are capable of improvement, and when designed on scientific lines and heated over a modern gas ring or oil burner they still remain the most satisfactory means for obtaining quickly a small amount of *boiling* water. There are now many kettles on the market, designed by means of fins or some similar device to present a large heating surface, or by means of an inside plate to assist the internal circulation of the water and so expedite boiling. But *boiling* water is rarely required in a household, except for making tea or preparing starch—rather the problem is to obtain a larger and more constant supply at a less intense temperature.

The copper is the next system in the hierarchy of appliances, and this is the means most often met with in the cottage type of dwelling. Primarily the copper is a large, built-in vessel under which a fire is lighted in order to obtain hot water for laundry purposes. It is not intended for a daily supply. However, lately its use has been extended. Baths have now become more usual in even the smallest cottage, and the copper is often used to supply it with hot water. The simplest method is by means of a gravity feed from copper to bath, but this necessitates, of course, a bath not only on the ground floor but slightly sunk below the level of the copper to obtain the necessary feed. Inventive ingenuity soon went farther and devised a small piece of apparatus, known as an "injector," by means of which, by turning on cold water into a copper filled with hot water, the hot water is forced up a pipe and made to discharge over a bath on the first floor. It is necessary for this purpose, of course, that there be sufficient head of water. This piece of apparatus is detachable and does not, therefore, interfere with the copper when it is used for washing purposes. Another invention goes a little farther and enables the copper to supply hot water to a bath, sink, and wash basin. The method is by means of a three-way cock to transform the copper into an open boiler of a small circulating supply system; this device, therefore, includes a small hot water storage tank. These methods of supply are inexpensive and adequate to the needs of a small cottage. A portable copper would be installed instead of the old-fashioned built-in type, which is more costly and occupies much valuable space.

Passing on now to a somewhat larger type of dwelling, we come to a circulating system supplied from a boot-boiler placed in the old-fashioned kitchener. There is no need to dilate upon the disadvantages of this obsolete fitting. Opinion is unanimous in condemning it for its dirt, its inefficiency, and its enormous waste in fuel. Yet, the kitchener, fitted with a boot-boiler, is the apparatus upon which most existing houses are dependent for obtaining their hot water supply. The tendency to-day is everywhere towards specialisation, and it is found that greater efficiency and economy are obtained by the use of a special apparatus to maintain the hot water supply. There are, however, many good ranges which are designed as an intermediate step between the old-fashioned kitchener and the independent boiler, in which, although the oven and the boiler are kept quite separate, the one fire is used to serve both. The oven is maintained at a mean temperature, and additional heat is obtained when required by diverting it, by means of dampers, on to the boiler. In some types the heat of the oven may be augmented by means of gas. These ranges are self-setting, free-standing, and altogether more accessible and cleaner than the old-fashioned type; moreover, many of them are designed to burn anthracite, which, as everyone now realises, is free from most of the disadvantages of soft coal. In small flats, or in houses with small households, one of the combination stoves which are designed to heat the room, to cook, and to heat a boiler, will be found to yield an adequate hot water supply. There is one, designed to be placed in a wall between the kitchen and sitting room, in which a single fire heats both rooms and a centrally placed boiler and oven, but the amount of water that can be obtained from such an apparatus is strictly limited.

Where a constant supply is required it will be found without doubt most satisfactory and most economical to install an independent coke-burning boiler, whose main (if not sole) function it is to supply domestic hot water. Very often it is possible, without in any way impairing the service, to heat one or two radiators off the boiler, a marked additional advantage; also the fact that these boilers require practically no attention, and that they will burn household rubbish, increases their value for the moderate-sized household. In a house already equipped with an old-fashioned kitchener which it is desired to supersede all that may be necessary is to attach the existing circulating system to a small boiler. Where an entirely new system is to be installed, or where the existing hot water storage tank is badly placed or inadequate, it is better to install one in which the boiler and a hot water cylinder are in conjunction. There are many combinations of this kind available. Many boilers which have a flat top and in which the fire is not situated too low may be used for a small amount of cooking. This does not mean that all the cooking can be done on them; that, indeed, would be a reversion to the kitchener. Their main object is to supply hot water, but, nevertheless, on certain types it is possible to boil a kettle, or heat a saucepan; others have an arrangement of doors by which, when full concentration is not required on the boiler, the fire may be used to heat the room or to heat up irons, or to toast. On such a boiler it is possible very often to cook the breakfast, thus dispensing with the main cooking apparatus until the preparation of the mid-day meal.

Where a constant supply of hot water is not required there is no doubt that gas provides many economical and convenient methods for obtaining it. The apparatus falls into two classes, general and local; those which provide hot water to all the fittings in the house from one source, and those which provide it locally to a single fitting. The first consists of a circulating system, the boiler of which is heated by gas. Almost all these boilers are now fitted with a thermostat, a device which automatically varies the gas consumption with that of the water. The arrangement is economical, therefore, when too much demand is not made upon the system; but a constant demand entails a large consumption of gas, which is not yet an economical fuel. The best-known example of the other type of apparatus is the geyser. Geysers are now so efficient in their action that they will provide hot water almost instantaneously, taking no longer than is required to empty the cold water standing in the pipes of an ordinary circulating system. Where a wash-basin is in the same room it is an easy matter to make a single geyser serve either the bath or a basin. There are, however, geysers of a somewhat larger type designed to supply bath and wash-basin and fitted with a third draw-off tap. Where a wash-basin is in the lavatory a small gas-heater can be installed which will provide a small flow of hot water constantly. The same apparatus can be fitted over a sink, but probably more convenient will be one of the patent open boilers which hold two or more gallons according to size, and which are fitted with a thermostat so that the gas supply is regulated. Such a boiler supplies the sink, and enables hot water to be drawn off by hand at any time and used for other purposes about the house.

The appliances which we have so far considered, whether providing a local or a general supply, are fixed. One or two small appliances are now made which are portable and can be used in any room in which there is a gas fitting to which they can be attached by a flexible tube. They are filled by hand with cold water, which is then heated and kept at a mean temperature. In order to draw off the hot water more cold water is poured in, and the action of this is to force out the already heated water. Such an apparatus can be used in the scullery or the bedroom, but would, of course, not supply sufficient for a bath except by a slow and laborious process.

With the advent of cheap electricity a new means will doubtless be afforded for providing a permanent hot-water supply; meanwhile, however, its uses in this direction are limited to boiling a kettle and even for this purpose it cannot compare favourably as regards economy with any of the methods mentioned above. However, it has certain decided advantages which often make it the most desirable means for boiling a small amount of water. The vessel and the heating apparatus are in one; they are absolutely clean and can be stood on any piece of furniture without damaging it. They require no ignition and are portable.

The development of oil for domestic purposes is proceeding apace. It can be burnt either as a liquid by means of wicks, or mixed with air as a gas. It is probable that it is in the last direction that most development will occur. Modern apparatus which generates under pressure is now acquiring safety and silence. At present, there are no means available for maintaining a constant general household hot water service by means of oil, but where gas is not available an oil geyser may be substituted. There is also an apparatus on the market which is portable and which can be attached to any water supply. Such an arrangement can be used either at the sink or the bath or wash-basin. A certain amount of care, however, must be exercised in the use of such appliances, and they cannot be said to be "fool-proof," as is a modern geyser. The burner should not be filled in the house and care must always be taken to see that heat is never applied to an empty vessel—an impossible contingency with a good geyser.

It will be seen that, compared with a generation ago, when the kitchener was the only recognised means of obtaining constant hot water in the medium-sized house, the methods now available are many; but the final choice must depend upon the individual requirements of the household, and should alway be considered in conjunction with the lighting and cooking arrangements.

NOTES ON VENTILATION.

Introduction.

VENTILATION in the sense in which the word is generally accepted means the continuous and more or less regular changing or renewal of the air in an enclosed space. Ventilation is desired and provided in order to remove impurities or stagnation of the air, and to ensure continual freshness by replacing vitiated air with new air. The greater the use to which air is put the greater the need for adequate ventilation.

While ventilation may be required to remove an excess of water vapour arising from various causes, or to keep an uninhabited space free from dampness, or to remove foul or noxious odours produced either by natural or manufacturing processes, it is more generally employed to dilute and remove the exhalations of human beings and the products of combustion due to heating and illuminating apparatus, and to maintain the air condition, both as to quality and temperature, within the limits required for general comfort.

Ventilation involves the introduction of air as clean and pure as possible, with the necessary amount of moisture or humidity, its general diffusion throughout the space to be dealt with, and the removal of the contaminated air constantly and regularly. The great majority of human habitations in places subject to low temperatures have no special provisions of ventilation during those periods when artificial heating is necessary. Even in the majority of large and costly public buildings, such as theatres, music halls, churches, municipal buildings, and the like, it is only comparatively recently that serious thought has been given to this subject. This has undoubtedly been due to the want of appreciation of the value in improvement and maintenance of general health and comfort to be secured by adequate ventilation. Greater regard is gradually being given to the vital subject, but much further advancement has still to be made before we shall have reached the stage where ventilation is held in the esteem commensurate with its value to the community.

If, in selecting a house, or in considering which school to send children to, inquiries were made as to the means of ventilation provided, those making such inquiries would but a short time ago—if not now—be numbered among the cranks and faddists. Even now it is safe to say that such a person would be considered too particular. The evil effects of the continuous inhalation of impure air are not such as in most cases to attract notice, unless the impurity be considerable or because the temperature and moisture be such as to produce discomfort at the time. The injury caused by breathing air deficient in oxygen or contaminated by organic exhalations and emanations is not, or may not be, perceptible for some considerable time, and even then may be attributed to other causes. Not only must we consider the harmfulness of impure air, but it must be borne in mind that such air forms a more suitable medium for the production or aggravation of illness and disease, especially of those complaints which are affections of the respiratory system.

Ventilation is just as necessary for cleanliness as it is as a disease preventative. We should be just as loath to breathe the air exhalations of others as we are to put into our mouths anything which has the merest suspicion of being unclean. In many cases it is difficult, if not impossible, to separate the effects of impure air from those of insufficient or improper feeding, but, if we consider the importance of respiration to life, the large surfaces which the air-passages and lungs present for the reception of micro-organisms, and the favourable conditions as to temperature and moisture for their development, we can readily see that the purity of air, and the constant removal of the excretions borne out with it, must have much to do with the health and vigour of the individual. All this may be more or less general knowledge, but it cannot be too often reiterated that adequate ventilation is not merely a good thing theoretically, but an absolute necessity for the preservation of health, and worth providing special means to secure.

In considering the subject of ventilation we have therefore to bear in mind the chemical and physical qualities of the air and the various causes of the changes in its composition or characteristics which necessitate its removal. We have also to consider the means available to produce movement of the air in the direction and manner best suited to the requirements, and also the arrangements of inlets and outlets to secure the entrance, diffusion, and exit of air in a manner desirable for efficient results.

When the quantity of air to be supplied has been determined, the general principles which govern the arrangements in a room or building to secure its satisfactory introduction and distribution are comparatively simple, but their practical application requires special study of the circumstances and characteristics of each individual building to secure the best results. In other words, the best results are obtained by taking each problem on its merits. As will be shown later, no hard-and-fast lines can be drawn governing the application of means of ventilation, but only general principles, because of the different factors to which due consideration must be given.

Until recent years it was generally accepted that the harmful effect of vitiated air was due to the presence of carbon dioxide, but it has been proved by the research work of Dr. Leonard Hill and others that such is not the case. It has been demonstrated that the presence of carbon dioxide in quantities many times what was at one time considered the maximum can be withstood by the human organism without harmful effect. In present-day practice carbon dioxide need only be regarded as an indicator of air vitiation, and the consequent need for a greater or lesser extent of the provision of means of ventilation.

The main conditions rendering an atmosphere unhealthy or uncomfortable are incorrect temperature, excess of moisture, and motionless uniformity.

Touching upon the point of motionless uniformity, or "stillness," as it is more generally termed, and showing its importance upon the general bearing of comfort, it should hardly be necessary to refer to the great relief that is felt by a person in a crowded and stuffy atmosphere gently waving a fan or anything which may be used as such, and so setting the air in motion. The effect is to remove and dissipate the layer of heated air adjacent to the skin, and, although the air set in motion may be regarded as vitiated in that it may be higher in temperature than is considered necessary, and contain a larger percentage of moisture and CO_2 than required for best conditions, yet the mere movement is sufficient to effect a considerable benefit. We are generally familiar with the apparent relief to be observed by the running of the pedestal type of fan, merely setting the air of a room in motion.

It is possible to have a space with what may be considered a low CO_2 content more uncomfortable than one with a higher figure if in the former case the air is still and humid and in the latter case of normal humidity and in gentle motion. It is only in quite recent years that much thought has been given to the question of relative humidity and its relationship to comfort for the human being. Relative humidity may be defined as the percentage of moisture contained by air at its temperature compared with what it could contain if saturated. The higher the air temperature the greater the quantity of water vapour required for saturation, as the following three examples will show:—

Air Temperature.	Grains of moisture per cub. ft. at saturation.
33 deg. F.	= 2.2
60 deg. F.	= 5.75
90 deg. F.	= 14.75

It will be seen that air at 60 deg. F. requires to saturate it rather more than two and a half times the weight of water vapour to saturate it at 33 deg. F. When air is heated it will be seen that its percentage of moisture or relative humidity will be lowered, for if air at 33 deg. F. and saturated is heated to 60 deg. F. without coming into contact with moisture it will contain the same weight of water per cubic foot as at the initial temperature. The air under this condition at 60 deg. F. would therefore contain 2.2 grains per cubic foot, whereas it could hold 5.75

grains per cubic foot, and therefore it would be stated that the air is 38 per cent. saturated, or has a relative humidity of 38 per cent. Such a condition as this is termed "dry heat," and causes an excessive evaporation of moisture to take place from the skin and respiratory organs. It is for this reason that objection has been raised in the past to the use of hot water, and particularly steam radiators, because the temperature of the air has been raised without the addition of moisture. To overcome this one finds small vessels containing water placed near radiators, gas fires, etc.

The evaporation of water into water vapour requires a relatively large amount of heat termed "latent heat." * The sense of coolness which one feels in an atmosphere where the temperature may be right but the air is very dry is due to the heat given up by the body to evaporate the water from the surface of the skin. On the other hand, if the moisture present is excessive, the heat absorbed from the body is much less, and, when insufficient, a feeling of discomfort is felt.

The ideal method of ventilation should therefore, as far as practically possible, aim at ensuring correct comfort temperature, correct humidity, and gentle motion without in any way creating draughts, which, after all, are air currents moving at high velocity and so causing excessive cooling or evaporation from the skin. In this respect velocity of air movement is of great importance, for air at 60 deg. F. moving at a high rate can be a greater objection than air at a much lower temperature moving more slowly.

Systems of Ventilation.

These notes will deal mainly, if not entirely, with mechanical systems of ventilation, and not what is termed natural ventilation. The chief reason is that mechanical ventilation has already become a *sine quâ non* with modern building design and construction, and because with existing buildings mechanical means are applied to overcome the deficiencies of an erstwhile natural system. For a natural system of ventilation to be efficient it would be necessary to design and lay out the building to suit the methods of ventilation, a possibility generally precluded by want of space and the cost of building construction.

In dealing with ventilation problems, and considering particularly this question of air movement, one must take cognisance not only of the velocity of the air as it enters the room or space through the various inlets, but also the forward movement of the bulk of the air supplied across the compartment. Take, for example, two rooms or small halls, say, each with the same seating capacity but one being 9 ft. high and the other 18 ft. The air inlets are in each case arranged for the same inlet velocity. There would be greater risk of draught or air motion being noticed and perhaps objectionable in the room 9 ft. high than in the room of 18 ft.

Ventilation problems as they appeal to the designing engineer or contractor may be separated with a fairly well-marked dividing line into two parts, namely, existing buildings and new buildings. Invariably the ventilation of an existing building entails greater difficulties and becomes a greater problem than is the case with new buildings. The primary and chief reason is, of course, the fact that the place exists, and must be dealt with as efficiently as possible with the minimum of structural alteration, or what is generally referred to by contractors as "cutting away and making good," and which can be a very costly part of a complete installation, and may easily reach 25 per cent. to 30 per cent. of the total cost. With new buildings suitable arrangements may be made in the course of construction to facilitate the application of ventilation. Ducts for the passage of the air to the various rooms or points of distribution can be constructed in the walls and floors of brick or concrete. Adequate space in a convenient and central position may be allocated to the plant, and, generally speaking, the whole question becomes much simpler.

* Latent heat is the heat necessary to produce a change of state or condition without a change in temperature.

Standards of Ventilation.

Various standards of requirements according to the nature or particular use of the compartment of building to be ventilated have been from time to time named by various authorities, and generally speaking they are based on a definite volume of air per person per hour or a specific number of changes of air per hour.

With regard to the latter, whilst it is termed "number of changes," it cannot be definitely asserted that the space actually has the air completely changed so many times per hour. The statement represents the volume introduced per hour divided by the cubic contents, but it would in most cases be a practical impossibility to ensure that every portion of the air contained in the building is replaced by the new air supplied. The standards of volume may be based upon the maintenance of the CO_2 content at a predetermined figure, or upon the necessary amount for the dispersal or dissipation of bodily heat and heat from other sources. It would appear that calculations of volume based upon bodily heat are flexible to a large extent, because the bodily heat in British thermal units is a variable figure depending upon many conditions and circumstances, and it is doubtful whether the theoretical temperature rise upon the air of an apartment due to bodily heat is ever attained. As already mentioned, the amount of CO_2 present forms a very useful indicator as to the sufficiency of the ventilation, and its value lies in the fact that the indication is comparative.

Hereunder is given in tabular form the CO_2 content when the external air or original air contains 4 parts per 10,000 cubic ft., and certain volumes of this air are being introduced to dilute the CO_2 exhalation of the persons present:—

TABLE No. 1.

Cub. ft. of Air supplied per person per hour, and having Initial Content of 4 parts CO_2 per 10,000.	Total parts CO_2 per 10,000 showing Air Vitiation.
6,000	5.0
5,000	5.2
4,000	5.5
3,000	6.0
2,400	6.5
2,000	7.0
1,800	7.3
1,714	7.5
1,500	8.0
1,200	9.0
1,000	10.0
750	12.0
545	15.0
375	20.0
231	30.0

Ventilation standards may be regarded as affording valuable guidance, but it is not to be supposed that they are rigidly fixed and must be adhered to without variation for satisfactory results. Good results can be, and have been, obtained with volumes below the standards generally given, for so much depends on application. The subject of ventilation is very far from being an exact science.

Standard Requirements of Heating and Ventilation.

Except in so far as Home Office Regulations are made to apply to factories, textile mills, etc., no hard-and-fast regulations or standard requirements are laid down in this country by any public body or those likely to have control over such matters. The London County Council has long given attention to this subject in relation to places of public assembly within its area, and this year altered its regulations so that it is now necessary for such buildings to be ventilated to the satisfaction of the Council. [*The Builder*, June 30.]

Generally speaking, however, the engineer tackling ventilation problems must be guided by experience, which forms a very sound and reliable basis to work upon. Standardised regulations which have been drawn up in the United States are also useful, but owing to the greater extremes of temperatures and other local conditions the requirements there laid down are rather in excess of what is considered necessary in Great Britain.

The following table of requirements of ventilation† is taken from a valuable American publication:—

AIR CHANGES OR VOLUME TO BE USED AS A BASIS FOR HEATING AND VENTILATION CALCULATIONS. (J. D. SMALL.)

Hospitals.

Ordinary	35–40	cub. ft. per min. per person
Epidermic	80	" " "
Detention-room	Air change	6 min.
Toilet-room	" "	6 "
Bath and duty-rooms	" "	8 "
Kitchen	" "	3 "
Serving	" "	10 "
Fumigating	" "	10 "
Workshops	25	cub. ft. per min. per person
Prisons	30	" " "
Theatres	20–30	" " "
Meeting halls	20	" " "
Schools	30	" " " child
And	40	" " " adult

Hotels.

	min. change.		min. change.
Kitchen	1½–5	Main lobby	20
Restaurant	6	Café	8
Billiard-room	10	Retiring-rooms	10
Dining-room	15	All others	15

Laundries should have air change every 4 to 6 mins.

Generally speaking, it will be found that 75 per cent. of the above-mentioned volumes is sufficient to give good results in this country. The London County Council has been working upon a standard of 750 cu. ft. per hour per person for London theatres and music-halls with very good results. Where conditions have favoured the use of a smaller volume per person even than this the results have proved satisfactory. It is desirable when considering the volume of air to provide not only to consider the volume of air per person, but also to have regard to the number of changes per hour which the proposed volume will give to the occupied space.

The smaller the cubic contents of the occupied space to be dealt with the greater the number of changes, with the result that the fresh air supplied is brought into more intimate contact with the persons, and this fact alone will often enable a smaller volume to be used to advantage.

Temperature and Humidity.

The usual inside temperatures specified in this country are as follows:—

	Deg. F.
Public buildings	60—65
Factories	55—60
Office buildings and residences	63—65
Schools	63—65
Hospitals	65—68

Except in textile mills, where the Home Office stipulates that the relative humidity shall not exceed 70 per cent. approximately and a temperature of 80 to 82 deg. F. dry bulb, 75 deg. F. wet bulb, no specified conditions are at present to be found. It has, however, been found from experience that with a temperature of 60 deg. F. to 65 deg. F. a maintained relative humidity of 45 to 50 per cent. gives the best results for comfort. It should be noted that for comfort the higher temperature requires the lower humidity, and *vice versa*.

The ventilation of buildings, both existing and new, can be carried out by one of three

† "Mechanical Equipment of Buildings." Vol. 1. By Harding and Willard. U.S.A.: John Wiley & Sons. London: Chapman & Hall, Ltd.

methods or systems. The first is known as the plenum system, or pressure system, and is what may be regarded as a "supply" system only where no special appliances are provided for the exhaustion of the excess of air, the egress of this being through existing openings, such as doors, windows, roof ventilators, etc. Second, there is the exhaust system, which, as the name implies, consists of providing means for the forceful exhaustion of air from the building and leaving the fresh air to replace that exhausted to enter by doors, windows, and any special openings which may be provided. Third, we have the combination of these two systems, which is sometimes referred to as a "balanced" system. As a modification of the last-named method we have what is termed a "recirculating" system, which has been applied with a marked degree of success where conditions have been suitable. The adoption of this system shows an appreciable economy where the ventilation is also used as the means of heating in the winter months. As the name implies, the air supplied to the building is exhausted from the building, and before being returned is washed and cooled and purified. Provision is also made for the addition of a proportion of fresh external air, if necessary, to prevent the CO_2 content rising too high.

As to the merits of the respective systems, each has its advantages if care is taken in its application and the needs of the building judiciously considered.

Plenum System.

The outstanding features of the plenum system are (1) the pre-determining of the source of fresh air supply; (2) ability to cleanse, purify, and condition the air before delivering it to the building; (3) control of the quantity of air delivered to pre-arranged points, and the selection of the points at which the fresh air shall enter. The surplus air must leave through suitable openings, preferably in the upper parts of the room or building. The surplus air will be caused to leave by increase in temperature after delivery and owing to the slight pressure caused by the supply of the fresh air under an initial pressure. This slight pressure has an added advantage in preventing or mitigating draughts through cracks in doors or windows, as the tendency for air movement is rather in an "outward" direction than "inward."

Exhaust System.

This method has its particular applications, but should never be used for the ventilation of buildings or rooms in general. The chief reasons are that it is very difficult, if not impossible, to control the fresh-air supply either in its source or temperature and purity. Moreover, there is the liability to draught through every crack and opening. The ventilation of cinemas of smaller size, for example, has been attempted by the placing of one or more exhaust fans in the roof and not providing an adequate or suitable means for fresh-air supply. The result is that during the time a picture is showing very little air-change is taking place, but immediately a picture is concluded and doors are opened there is a great inrush of air.

The exhaust system is eminently suitable for kitchens or workrooms where odours are produced and where it is necessary to prevent these odours from passing to adjoining rooms. In an hotel kitchen with dining-room adjoining the exhaust should be arranged in the kitchen so that any movement of air between the dining-room and kitchen is from the dining-room into the kitchen. The application of the exhaust system for removing odours gives the advantage of enabling the smells to be delivered where they will not create objection should it be necessary or desirable.

Plenum Exhaust System.

As already stated, this is a combination of the two above-mentioned, and would be used where the plenum system alone is likely to fall short of requirements owing to severe conditions or inadequacy of the means existing to allow the excess air to get away. In such cases where the combined systems are applied the volume of air exhausted should be less, generally about three-quarters to two-thirds of the quantity of air supplied, to maintain the advantages of the plenum system.

Recirculating System.

This system, as already hinted, offers its chief advantage in the one word "economy," which applies to capital cost and running cost. Under the first heading it will be seen that one fan is applied in place of the two necessary with a plenum and exhaust system, as the recirculating system is a combination of both. This also gives a saving in motive power for driving the fans. Then, in the winter months the cost of raising incoming fresh air to the desired temperature is obviated except in regard to the small proportion which is sometimes admitted. This system has now advanced beyond the experimental stage.

Equipment and its Selection.

For the air supply the following plant is necessary:—

(1) Fan, with means to drive it—generally an electric motor.

(2) Primary, or pre-heater, operated generally by low-pressure steam or hot water.

(3) Air filter.

(4) Final heater.

(5) Air delivery ducts, with outlets at suitable places and dampers or means of regulating the air supply to different points.

The above items may be considered to comprise a complete plenum system, but a further addition may be made in the adoption of automatic control of temperature and humidity. Where capital cost has to be seriously limited it is customary to have one heating battery and to eliminate the air filter or provide some means at comparatively low cost for partially filtering the incoming air before delivery to the building. In factory installations the filter is often entirely omitted. In public buildings the inclusion of an efficient filter is not only essential from a health point of view; it can also be demonstrated that the adoption of a filter should not be considered a luxury, but that it is of financial value. In large buildings the saving in costs of periodic redecoration is very considerable, and in the case of cinemas, theatres, etc., there is no doubt a number of people who will patronise the house which provides the greater comfort in preference to another, and must in course of time thereby produce increased revenue. There is no doubt that a stuffy or badly ventilated theatre or cinema will counteract to some extent the "draw" of a good programme, for the public is most certainly learning to discriminate on this question.

Selection of size of fan is based upon the volume of air to be handled, the resistance to be overcome in getting the quantity of air necessary through the system to the points of distribution, and, lastly, reasonably silent operation. The type of fan best suited to a plenum supply system is the centrifugal type cased fan. The propeller type of fan is unsuitable for overcoming much resistance, and should therefore not be used for drawing through or blowing through long lengths of duct or other apparatus comprising the installation, all of which offer resistance to passage of the air.

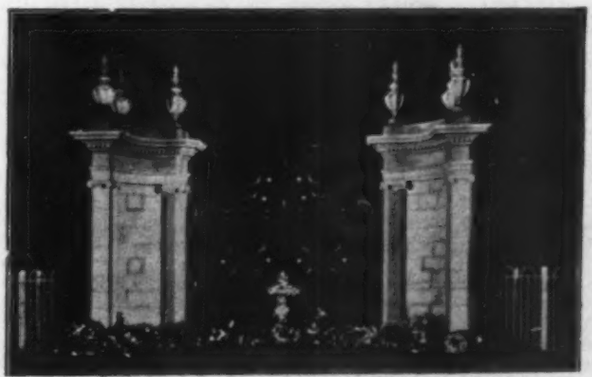
Another point which has to be borne in mind when using this type of fan is that the insertion of resistance in the air circuit with a consequent reduction in volume increases the load upon the fan motor, assuming, of course, the speed remains constant. This increase can be as much as three times the normal load. This is the reverse of what takes place with the cased-type fan, which with an increase in resistance and consequent reduction in volume absorbs less power. It should also be borne in mind that there are invariably at least two sizes of fan for a specific duty. The larger one will operate more silently and will show a lower operating cost, but, of course, the capital outlay involved is rather more. The difference in cost, however, is often quickly recoverable by the saving in operating cost.

Technical points involved in selecting size of fan are beyond the purview of these notes, and are much better left to the ventilating engineer and the fan manufacturers. The installation has to be designed first, and the size of fan is practically the last thing to be considered and settled upon.

Silent operation is governed by fan design and speed, not only in revolutions per minute, but in velocity of the air movement through the fan. It will generally be found that fans of the multivane type are more silent in operation than the paddle-wheel type.

The primary, or pre-heater, is sized from the volume of air to be dealt with and the temperature through which the air has to be raised. The object of the pre-heater is to raise the temperature of the incoming air before it comes into contact with the water of the filter, thereby causing the air to pick up moisture and so provide that the air is delivered with a desirable relative humidity. In this connection it is also sometimes necessary to warm the water of the filter by means of a calorifier or other suitable means.

The air filter, to obtain the best results, should be of the water-spray type. These have now been brought to a high state of efficiency, and, moreover, in the type which operates by the circulation of a large quantity of water—amounting to as much as 5 gallons per 1,000 cubic ft. per minute—a very valuable cooling effect of the incoming air is obtainable during the warm summer weather. The water is recirculated by being passed through filters of the strainer type before coming into contact with the air a second time. This operation is generally performed by a pump of the centri-



Night Illumination of Rugby War Memorial Gates.

[These gates were floodlighted for three nights after the unveiling ceremony by an installation designed by the British Thomson-Houston Co., Ltd., Rugby.]

fugal type. Operating under such conditions, filters will give as much as 70 per cent. to 90 per cent. cooling of the difference between the dry and wet bulb temperatures of the incoming air. To demonstrate this by figures, we will assume that the air is entering the washer at 75 deg. F., 50 per cent. relative humidity. The wet bulb temperature of this air condition is 62 deg. F., and the air may be expected to leave the washer at a temperature of 63 to 66 deg. F. Greater cooling than this may be obtained by lowering the temperature of the washer water by means of ice or refrigeration coils. As an alternative, when available, use may be made of artesian well water, which will generally be at temperatures between 45 deg. F. and 55 deg. F.

The final heater is used to raise the air in winter to the desired temperature. This final temperature will depend upon whether the building is heated by other means, and it is therefore necessary only to raise the incoming air temperature to about the desired temperature in the building. If, on the other hand, use is made of the ventilation air for warming the building, the air must be raised in temperature sufficiently to take care of the radiation losses, and after having given up this heat, remain at the desired room temperature.

It is generally preferable that radiator heating be provided for entrance halls and corridors, and to supply part of the heating for the main portions of the building. This obviates the need for the air delivered by the ventilation system being raised to too high a figure.

Arrangements are made in conjunction with the air filter and pre-heater to ensure that the air leaves the washer at 50 deg. F. to 55 deg. F. saturated, and when this air is reheated on the final heater to the desired temperature it will have the correct humidity for comfort.

The automatic control to which reference has been made is used to control automatically the temperature of saturation of the air leaving the filter, and also to control the two heating batteries. Automatic control is effected either by control of the rate or quantity of flow of steam or hot water to the heating batteries, or by automatically controlling air dampers which vary the amount of air passing through the heater and by-passing the remainder.

(To be concluded.)

ELECTRIC LAMPS AND FITTINGS.

By "M.I.E.E."

REMEMBERING that electric lighting has now been practised for some forty years, and can by no means be regarded as still "in its infancy," it is remarkable how often one sees it extravagantly used and grossly misapplied. Not only are brilliant lamps frequently exposed to the naked eye without any kind of shade or reflector, squandering their illumination in all directions and largely wasting it, but, even when shades are used, they are only too often utterly unsuitable for the purpose, and merely intercept some of the light without directing it into useful paths, whilst in many cases even then they fail to protect the eye. A walk or drive through the streets of London, and probably any other town where electricity is available, readily reveals numerous instances of such crude and unscientific illumination without discrimination. The evil was abundantly in evidence in the days of the tungsten vacuum lamp, which was much more brilliant than the old carbon lamps, and therefore correspondingly liable to produce a glaring effect; but it has been greatly intensified by the increasing adoption of the "gas-filled" lamp, the filament of which is run at a much higher temperature and is so dazzling that it ought *never* under any consideration to be directly visible to the eye.

The guiding principles in planning illumination are quite simple and easily remembered. The most important, perhaps, is the fact that the eye is extraordinarily adaptable to external light stimuli; whenever a bright light comes within the range of vision, the pupil contracts so as to permit a less amount of light to enter the lens as a matter of self-protection; the inevitable consequence is that not only is the bright source of light partly screened off, but also the amount of light received from the surroundings in general is diminished and *visibility reduced*. Consequently, although a bright light is used, the result may readily be that objects are less distinctly seen with its aid than with a much less brilliant source of light more scientifically applied.

The quality of the light source which controls this action is its "intrinsic brilliancy"—*i.e.*, its candle-power per unit of area. The intrinsic brilliancy or "brightness" of the moon is about two candles per square inch, and the eye can gaze upon it without discomfort; the brightness of white paper in bright sunlight is about nine, and this is distinctly trying to the eye. The brightness of an inverted gas mantle is 50—but that of a tungsten vacuum lamp is 1,000 candles per square inch of filament, and that of a gas-filled lamp is no less than 5,000—100 times that of a (low-pressure) gas mantle. It will readily be understood, therefore, that to place a tungsten lamp anywhere in the line of vision is bad lighting practice; whilst the eye is dazzled and the unthinking person may suppose that there is plenty of light, the fact is that the useful effect obtained—the visibility of objects—is very poor. Whenever a source of light is seen to scintillate—whenever it appears to be the focus of a starry bunch of sparkling little rays—its brightness is much too intense, and it should be properly screened.

In the case of the old carbon lamps, and under some circumstances the vacuum-type metallic-filament lamps, it is not essential to interpose a diffusing medium between the eye and the filament; the desired relief to the eye can be obtained by placing a bright surface behind the filament, of sufficient area to reduce the average brightness of the combination to a reasonable value. Thus, a lamp provided with an opal or white-enamelled reflector, which forms a background to the filament, can be accepted as fairly satisfactory, but the reflector must be deep enough to ensure that the lamp is not viewed below its edge. For this reason the shallow conical reflectors which were so commonly used with carbon lamps are quite unsuitable for tungsten lamps of the straight-filament type, which are usually long enough to project far below the margin of the reflector, as seen from almost any angle except the axial direction. Only too often cases are met with where the shallow reflector used with the carbon lamp has been retained when the more efficient tungsten lamp has been adopted; the new lamp has been inserted in the existing fitting without a thought as to whether the combination thus formed was right and proper. The only condition under which such reflectors are suitable is when the lamps are fixed at a considerable height, so that they are outside the normal field of vision; this condition is fulfilled when the rays from the lamp to the person are within an angle of 30 deg. with the vertical. In other situations, the reflector should be of such a depth that the filament does not protrude below a plane touching the lip of the reflector.

The foregoing remarks apply to lamps with clear glass bulbs, without any diffusing medium between them and the eye; but it is an excellent plan to have the bulbs frosted or sand-blasted, at any rate over the lower hemisphere at the pip end. By this means the intrinsic brilliancy is reduced from 1,000 to about 10, with a loss of 5 or 6 per cent. of light, but a great improvement in illumination. Whilst frosting is desirable with vacuum lamps, it should be regarded as imperatively necessary in the case of gas-filled lamps which are not otherwise rendered glareless. The frosting also has the advantage of improving the illumination immediately beneath the lamp; a vacuum lamp of the straight-filament type gives hardly any light in the direction of the pip.

The "shades" which are frequently used in bracket fittings, carrying on the carbon-lamp tradition, are well-named, for they are generally useless as reflectors, and they do not even afford protection to the eye; they merely absorb a portion of the light which is directed upwards, and are supposed to be ornamental. There is not one word to be said in their favour. The fundamental purpose of lamps and fittings is to provide illumination in the absence of daylight; in former days, when this purpose was effected with the aid of innumerable candles, elaborate fittings were designed to receive the candles, and efforts were made to render them ornamental because they were necessarily fixed, and could not be removed in the daytime, when they were superfluous. Electricity, on the other hand, affords the most flexible and adaptable means of producing illumination that has ever been devised; with its aid daylight can be simulated, if desired, and yet the apparatus employed can be made inconspicuous to the last degree. There is no longer the slightest necessity to regard the lighting fittings as unavoidable features in a scheme of decoration, and to make them prominent objects is an entirely mistaken policy. Neatness and unobtrusiveness, combined with efficiency, should be the guiding principles in design. By efficiency here we mean effectiveness with regard to the provision of adequate, appropriate, and comfortable illumination.

Dealing with these points *seriatim*, adequate illumination is the result of providing a sufficient flux of light, and directing it in the right paths. So far we have referred mainly to the simplest combination of lamp and reflector, with special regard to the vacuum type of tungsten lamp, which emits most of its light in zones near the horizontal, and has an average candle-power in all directions not greatly different from the horizontal candle-power. But the modern tendency is, naturally, to use the more efficient gas-filled type, of which the horizontal candle-power may be considerably less than the average, and in fact it becomes useless to speak of "candle-power" any longer; we must deal with the total flux of light emitted by a lamp. This is measured in "lumens," and whilst we cannot here enlarge upon the subject, we may say that the flux in lumens of a straight-filament lamp is about 10 times its horizontal candle-power, or a 40-watt vacuum lamp gives about 330 lumens. A 40-watt gas-filled lamp, however, gives about 480 lumens. The output of light per watt varies with the size and voltage of lamps, increasing with the size, but diminishing with the voltage, so that a general value cannot be stated. By working with lumens instead of candle-power all kinds of light sources are made comparable, and illuminating engineering is placed upon a rational and scientific basis. Having given the dimensions of a room and the purpose for which it is to be used, we can at once determine the total number of lumens required for its adequate illumination, and when the type of lamp is chosen the electric power in watts at once follows. But important considerations arise here in respect of the manner in which the light is to be employed. The colour and texture of the surface of the walls and ceiling must be taken into account, as these have an important bearing on the question; and the type of fitting to be used is of still greater influence.

The light may pass directly from the lamp and from a reflector above it, to the working plane, as in the cases considered above; or it may be wholly directed upwards on a reflecting surface such as the ceiling, passing therefrom to the working plane (the "indirect" method),

the lamp being entirely hidden from sight by a reflector suspended beneath it; or a combination of these methods may be employed (the "semi-indirect" system). Some time ago there was a craze for indirect lighting, but while this had a softness and freedom from glare which somewhat resembled diffused daylight, and strongly appealed to some users, it was found that the absence of shadow and the excessive uniformity of the illumination had a depressing effect, and that although the illumination could be proved by measurement to be amply adequate, it gave an impression of inadequacy. On the other hand, the semi-indirect system combines the advantages of both its rivals, for it provides a sufficient proportion of direct illumination to avoid the flatness and monotony of the indirect system, whilst securing softness and complete freedom from glare; the fittings also are inconspicuous by day and of pleasing appearance at all times, particularly when in use. Consequently this system is rapidly growing in popularity, not only in dwelling houses but also in shops, assembly rooms, and factories. In its simplest form it comprises a bowl of opalescent glass suspended from the ceiling, with the lamp suspended within it, as near the bottom of the bowl as is convenient and safe. The density of the glass should be only sufficient to prevent glare—the position of the lamp should be clearly visible; if the density is too great much loss of light results, without any countervailing benefit. Veined marble and similar materials are subject to this objection. Whilst semi-indirect lighting involves a certain amount of loss of light, it is much more economical than indirect lighting, and owing to the absence of bright sources of light it does not cause the pupil of the eye to contract so much as the direct system, so that a lower intensity of illumination produces the same degree of visibility.

Lastly there is a system which does not come strictly within any of the foregoing categories; it employs globes of clear glass, accurately moulded so as to refract the rays of light into the paths in which they will be most usefully employed, and at the same time acting as a diffusing medium without material absorption of light. This is a highly scientific system, and combines efficiency with effectiveness; care is necessary to see that the lamps used are of a suitable type, and are fixed at exactly the right height in the globe to obtain the maximum effect. Subject to this consideration, excellent effects can be secured with this system.

One consideration is common to every system of lighting—the importance of cleanliness. The bowls used for indirect and semi-indirect lighting are especially liable to collect dust and dirt, but ordinary reflectors, as well as the lamp bulbs themselves, ought to be cleaned at fairly frequent intervals; otherwise there is a loss of light which attains surprising proportions, and which is wholly inexcusable.

THE PROGRESS OF GAS HEATING.

BY A GAS EXPERT.

THE rapid progress of the gas industry, which for a number of years has been so marked, has to some extent been checked during the past twelve months as a result of the bad state of the country's trade, which, combined with—or aggravated by—the unfortunate stoppage in the engineering world, has naturally reduced the consumption of gas for industrial purposes. In spite of these untoward circumstances, it is worthy of note that the application of gas as a heating agent in place of solid fuel for carrying out various trade processes has increased and is still continuously increasing.

The heating of premises and new methods and installations connected therewith, however, are of greater interest than heating processes, and it may be stated that the gas industry maintained unbroken and unchecked progress during the past year, which proved the busiest one it had ever known. The glorious skies and clear air experienced in our great cities and towns in the summer of 1921 during the period covered by the coal strike, when the consumption of raw coal was perforce so drastically reduced, have clearly not been forgotten by the general public. The benefits then gained and the conclusions subsequently arrived at by the Committee on Smoke and Noxious Vapours Abatement, in its final report dated December 6, 1921, combined with the continuous demand by housewives for convenient and labour-saving appliances in their homes, have led to a very large number of gas fires and heating stoves being installed in houses, shops, offices, &c.

The controversy in the public press on the subject of the new method of charging for gas consumed, *i.e.*, by the therm instead of by the thousand cubic feet, does not seem to have had any effect on the public as regards the installation of gas-heating stoves; indeed, one very large London company has at the present moment more men engaged on fixing such apparatus than ever before in its history. While on the subject of the therm, however, it would perhaps be of interest to set out a few details concerning the new method of charging for gas.

The New Method of Charging for Gas.

The "therm" system of charge was adopted by Parliament (in the Gas Regulation Act, 1920) on the initiative of the Board of Trade acting on the recommendations of the Fuel Research Board. The purpose of the change was to provide, in the interests of the consumers, a basis of charge better suited to the modern conditions of gas consumption. The utility of gas to-day, whether used for lighting, for heating purposes, or for power, depends directly upon its heating (or calorific) value; not, as in former years, on its "candle power." The value of a cubic foot of gas to the consumer, therefore, depends directly upon the number of heat units that quantity will develop when consumed.

The standard official unit of measurement of heat in this country is known as a British Thermal Unit (B.Th.U.), and is the amount of heat which has to be expended in order to raise the temperature of one pound of water by one degree Fahrenheit. The "therm" system of charging for gas provides that the quantity (*i.e.*, cubic feet) consumed, multiplied by the declared minimum number of heat units (B.Th.U.) represented by and contained in each cubic foot (*i.e.*, "the calorific value" of the gas) shall be the basis of payment by the consumer. For instance, each cubic foot of the gas now supplied by one large London company will develop not less than 500 British Thermal Units when burnt, and can be consumed with the maximum of efficiency in the gas appliances generally in use. The gas is tested—frequently every day—by the London County Council and Corporation of London, and the company would be fined heavily if the gas were not up to the declared value. In this case, a "thousand cubic feet," the old basis of charge, therefore, represents, at least—and for purpose of charge to the consumer is calculated to represent exactly—500,000 heat units (B.Th.U.).

The new basis of charge, the "therm," is the name given to 100,000 heat units—a constant standard of quantity as invariable as "a yard" or "a pound"—so that 1,000 cubic ft. of 500 B.Th.U gas = 500,000 B.Th.U, is now charged for as 5 therms, and if the price of the "therm" is 11d., then five times 11d. equals 4s. 7d., which is the price being charged per thousand cubic ft. Conversely, to transmute "therms" into cubic feet of 500 B.Th.U. gas all that is necessary is to multiply by 200. Consumers can thus readily compare the price they are being charged for any quantity of gas with that charged by their gas company before the war for the same quantity. It must be remembered that the meters still register in thousands of cubic feet, and the readings are taken in the same manner as usual, but the amount registered is then converted into "therms" for the purpose of charging up the account.

By the system explained above the consumer is charged for the minimum actual heat value received. "A thousand cubic feet of gas" is no more an absolute measure of value received than "a gallon of petrol," or "a quart of milk." Everything depends upon the quality. The consumer is now charged scientifically for "value received." The idea entertained in some quarters that the new system of charge is a device of gas companies to get more out of the public is entirely unfounded. The system—a perfectly fair and improved system—was suggested by an entirely independent body of scientific men; was approved by the Board of Trade, London County Council, the City Cor-

Fig 1.—Gas-heated Hot-water Radiator in a Boarding House.

poration, and the other local authorities concerned in safeguarding the public; and its introduction is being followed by a steady and substantial reduction in cost to the public for equal work done in lighting, cooking or heating. Any increase in a consumer's account for June Quarter, 1922, as compared with that of 1921, if not owing to extra appliances having been fixed or any change of circumstances in the premises concerned, is accounted for by the gas companies in the following manner:—

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Another direction in which gas heating is becoming a great feature is for bedrooms in boarding houses and small and large hotels; indeed, it is now by no means uncommon to see advertisements which point out as an additional attraction to the prospective guest that "there are gas fires in every bedroom." There is a great tendency on the part of the present-day men and women to take seaside holidays or long week-ends during the autumn, winter and early spring months, and it will readily be understood that the one thing necessary in the variable temperatures which are then experienced in this country is that some means of heating the bedroom should be available at any moment day or night, for short or long periods, as and when required. There is no other means of economically carrying out this desideratum than by the installation of a gas fire, and for convenience of charging the guest the modern small meters of the prepayment (1d., 6d. or 1s. in the slot) type are ideal. There are several varieties of this class of meter, but any or all of them can be arranged to pass any given quantity of gas desired for the coin which has to be inserted before gas may be obtained, and they are so small as to make it possible to cover them by a small, not unsightly, cabinet. Indeed, in some cases the gas company supplies such meters on hire including the necessary box cover.

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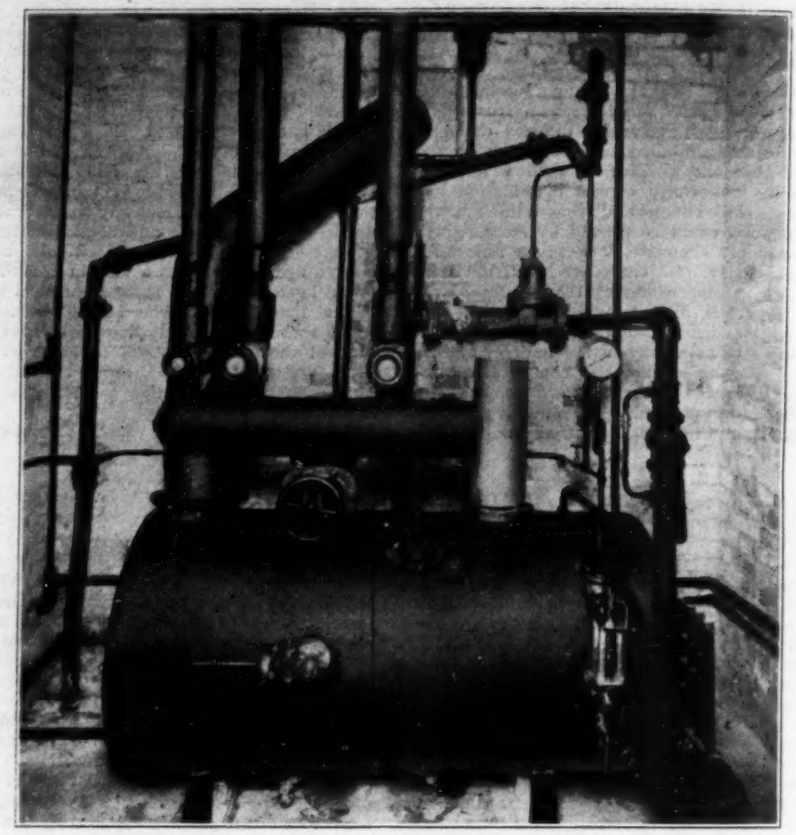

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The premises in this case (Fig. 1) in the West End of London, consisted of three upper floors with no basement accommodation, no suitable flues for solid fuel fired apparatus, and no convenience for fuel storage or for the removal of refuse therefrom. As each of the floors had to be cut up into a number of partitioned-off rooms, central heating by hot water radiators was decided upon, but, owing to the difficulties above mentioned it was decided to install gas-fired boilers as the heating medium. A heating chamber was, therefore, constructed in one of the rooms on the first floor, by partitioning off the necessary space, and the ordinary chimney to the coal fireplace in this room was utilised for the removal of the products of gas consumption from the four "Victor" gas boilers which were fitted in the heating chamber. Two of these boilers were installed to heat the first floor, and the remaining two for a separate heating system for the second floor. One extra boiler was also installed on and to heat the third floor. The boilers on the first floor serve eight radiators with a total heating surface of 261 square feet, those on the second floor eleven radiators with 238 square feet heating surface, and the one on the third floor six radiators with 115 square feet heating surface. The five boilers—each consuming 80 cubic feet of gas per hour when full on—therefore, heat a total of 614 square feet of radiator surface. The full consumption of gas, however, is usually only necessary when the system is being heated up. There is a thermostat suitably situated on each floor, fitted on the gas supplies, which are carried back to the respective boilers. These thermostats are actuated by the air temperature, and the gas consumptions therefore fall and rise automatically, according to requirements. The heat is thus regulated and the cost of gas reduced.

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These irregular conditions, coupled with the difficulty of providing a satisfactory boiler-room and flues of the ordinary kind, and the desirability of avoiding, if possible, the employment of a skilled stoker, rendered the devising of a rapid, compact, and easily controlled heating system of the first importance; and low-pressure steam generated by gas was decided upon as the most practical solution of the problem. A gas-fired steam-raising boiler is installed in a room under the middle of the building, in a position where a solid fuel-fired boiler would have been out of the question. Steam is delivered at a pressure of 2 lbs. to two distinct systems of radiators, each controlled by separate valves. The boiler, which is 2 ft. 3 in. in diameter by 5 ft. 9 in. long, is of the "Bonecourt" fire-tube type, gas flames

being injected into twenty-five tubes (each 2 in. in diameter), which pass through it from end to end. The boiler and the adjacent pipes are, of course, lagged, as is usual with all such installations. The flames are pulled through the tubes by the natural draught of the chimney, giving up in passing a very large proportion of the heat from the gas consumed, in other words, providing a very high working efficiency. A photograph of the boiler in the heating chamber is shown in Fig. 2.

The thermal efficiency of the apparatus is at least 85 per cent.; indeed, the makers claim to reach 90 per cent., but naturally this would only be obtained under ideal conditions. An automatic gas regulator actuated by steam pressure is coupled to the boiler, and its control is, therefore, entirely automatic. The maximum output of the boiler is 430,000 B.Th.U's. per hour, the consumption of gas to provide this maximum being about 5 therms, or 1,000 cubic ft. of 500 B.Th.U. gas per hour. The maximum, however, is only necessary when starting the apparatus, and the average load is calculated at about 2 therms, or 400 cubic ft., per hour, the intermittency of the demand making the installation quite an economical one.

The first system of radiators consists mainly of a battery situated under the floor of the centre aisle, connected with suitable inlet and outlet openings. This system is used for heating, and thus re-circulating the air ordinarily present in the building (*i.e.*, not mechanically induced) the volume of which is amply sufficient for such an occasion as a wedding.

The second system consists of batteries placed in air-inlet ducts running the full length of the Synagogue under the two side galleries and fed by two "Cyclone" blowers on the roof. These ducts are so perforated as to ensure perfect distribution with entire absence of draught.

For services and whenever the presence of a large number of persons for any length of time is anticipated the body of air present in the building is previously warmed to a suitable degree by the first system; and, when the congregation is assembled, the steam is diverted to the second system and the intake fans switched on, thus maintaining a constant supply of fresh air at the desired temperature.

Foul air is removed by two "Cyclone" fans through openings in the main ceiling and under the galleries, the power of these extractors being rather less than that of the intake fans, so as to mantain a slight plenum within the Synagogue.

The installation is sufficiently simple and convenient to be worked by a female caretaker, and rough preliminary tests show that, under average conditions, the whole building can be comfortably warmed within one hour of lighting the gas, as compared with several hours' heavy stoking had an ordinary boiler been used.

Although only the relative economy afforded by its convenience had been looked for in adopting this system, its actual efficiency is so high that the result, from the point of view of cost, appears likely to exceed the most favourable anticipation. It is perhaps worthy of mention that gas fires of the "built-in" type are installed for auxiliary and local heating in portions of the premises where heat may be required at times where the use of the steam heated systems would be both unnecessary and wasteful.

The scheme has been carried out from the design of Mr. Claude W. Ferrier, F.R.I.B.A., the architect of the building, by Messrs. T. S. Knight & Sons, of 222, Great Portland-street, W., who are arranging with the owners to undertake the entire maintenance of the plant and system.—C.

HEATING, LIGHTING, AND VENTILATION OF THE NEW PENSIONS MINISTRY BUILDING.

THE Pensions Ministry Building is a huge office designed to accommodate a staff of from five to six thousand persons, mainly employed in clerical work. Adequate light to every work table was a primary consideration in the lay-out of the rooms, which required to be warmed to a suitable temperature to allow of the employees sitting to their work with a reasonable degree of comfort.

Erected at a time of abnormally high prices of both material and labour, the attention of the architect, Mr. J. G. West, M.B.E., Senior Architect, H.M. Office of Works, was directed towards economy from the outset. Not only were the materials of construction—steel and concrete—chosen for their comparative cheapness, but a systematic attempt was made to design the whole building in accordance with scientific economy, both of first cost and of maintenance. Standardisation of parts was resorted to wherever possible, and the simple facts of the case are allowed to express themselves to a far greater extent than is usual in British architecture. The results of this frank outlook are extraordinarily fine, and a visit to the building is an education in the artistic value of common sense applied to architecture. As far as possible, the rooms for the staff have been kept large and undivided, though the stanchions upholding the floors in the interior of the building have been placed off the axis line in order that central corridors may be provided if required at any future time. At present the rooms are large and fairly lofty halls supported by a steel framework of stanchions and R.S.J. spaced in bays of 10 ft. 6 in., with floors filled in with Siegwart beams. External cavity walls were formed of two thicknesses of concrete blocks. The floors are screeded level on top and lino is laid direct on this cement float.

All the steelwork in the interior, including conduits and heating pipes, is exposed to view, but the run of the pipes has been kept to orderly lines with attention to appearance and utility at the same time. To avoid the expense of dipping the electric conduits under every R.S.J. the Siegwart beams were raised one inch above the top flange on a bed of fine concrete and the conduits were passed through the one-inch space between the steel and the floor beams, thus saving a great deal both in labour and material. Some very great economies were effected by careful attention to detail, and experimental tests were made in some cases to ascertain the relative cost of minor points connected with the engineering supplies. By preparing holes in advance in the concrete blocks for the supports a saving of 6s. 8d. per radiator was effected over the more usual method of knocking a hole in the finished wall.

The heating and ventilation are arranged by means of a hot water radiator in the centre of each bay of external wall space under the window, with inlet gratings in addition behind the radiators. The hot water pipes are carried as vertical branches throughout the height of the several floors, so that repairs can be carried out with a minimum of inconvenience to the occupants of the building. Cutting out one vertical branch only means the loss of one radiator in each large room on each floor, whereas had the radiators been connected in horizontal series a whole room would have been cut out at one time.

The hot water main circulates the building in ducts below the ground floor with removable concrete slab covers kept clear of the lino covering by being placed like a border along the walls of the several rooms. Hot water is provided for the circulation by means of a boiler-house in an independent building of similar construction in the rear of the main block, where three 28 ft. John Thompson Lancashire boilers have been converted for use as water heaters. The water is not normally heated above 180 deg., but the boilers are provided with safety valves against the accidental production of steam pressure. The circulation is assisted by means of an electric motor pump, which drives the hot water through 8 in. flow and return mains lagged with asbestos and bound with wire mesh.

A separate vertical boiler with cylinder for storage has been installed for hot water for domestic purposes and for draw-offs in the lavatories, where one hot-water point is supplied over a sink adjoining each range of basins, these being served with cold water only. For the canteen building, where a great deal of the cooking is done with steam, two vertical steam boilers have been provided with two Worthington's steam pumps for injecting water into the boilers.

Another separate building contains the canteen with seating accommodation for 1,200 persons and the canteen kitchen, which is fitted up with steam jacketed boilers, steam ovens, and hot-water plate-washers with electric motors. An ingenious rotary potato peeler is actuated by an electric motor, the skin being removed by contact with the roughened sides and floor of the container against which the potatoes are pressed by centrifugal force as the machine whirls round. The minute fragments of skin are removed through a central outlet in the bottom of the container by means of a stream of water discharging into a gully protected by a fine wire grating. Several gas-heated hot-plates, grillers and gas ovens are used in addition to those heated by steam. The servery lobby between the kitchen and canteen is screened by a dwarf partition of concrete slabs to the height of seven or eight feet, and is provided with two long steel hot plates and closets, a buffet and service counters, one of them provided with a machine for allotting portions of tea to different sizes of pot by one, two, or three turns of the handle. A soda fountain has been installed in one corner of the canteen, but the bad weather of the present summer has prevented such a brisk turnover as in other parts of the canteen, where the total business done shows signs of working out at the rate of something like forty or fifty thousand pounds a year.

The canteen hall is constructed in the same manner as the main building, with the steelwork exposed and painted grey with the enclosing concrete walls distempered buff. The roofs are flat with raised portions in the middle of the building, where a clerestory effect has been arranged with a row of windows all round the edges of each raised portion of the roof. The effect is very cheerful and pleasant, the solid flat roofs preventing the wan and watery gleam that generally comes through a top light in our climate. The electric lighting is provided in semicircular white opal glass bowls, but these had been covered with red crinkled paper on the occasion of some festive evening, when the removable tables are packed up and the broad expanse of floor served admirably for dancing.

In the offices of the main building lighting is arranged by the use of large sash windows in each bay during the daytime and artificial light is provided on the semi-indirect system by means of electric lamps contained out of sight from below in large semicircular opal bowls suspended about two feet below the ceiling. The quality of light was made the subject of condesirable experiment and the fittings chosen in accordance with medical advice. The ceilings and upper parts of the walls are distempered to a creamy white, the lower parts being coloured buff to produce a reflecting surface and diffuse light and economise current. The opal bowls are only illuminated to a sufficient degree to produce a mild and pleasant glow, thus avoiding the possibility of hurting the eyes by glare. The light on the worktables is well-nigh perfect, for no shadows are thrown although ample illumination is provided.

Cheaper Electric Light.

The Stoke Newington Borough Council has made a further reduction of a halfpenny per unit for electric light, making a reduction since June last from 7d. to 6d, for lighting, and 2½d. to 1½d. for domestic heating and cooking, and a reduction of a halfpenny for power.

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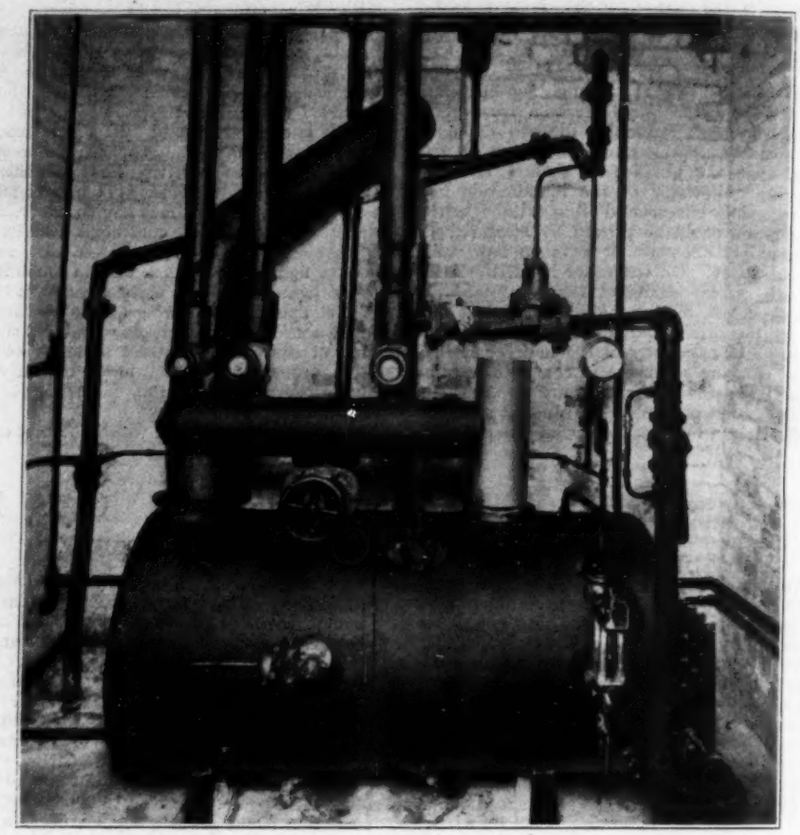

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HEATING, LIGHTING, AND VENTILATION OF THE NEW PENSIONS MINISTRY BUILDING.

THE Pensions Ministry Building is a huge office designed to accommodate a staff of from five to six thousand persons, mainly employed in clerical work. Adequate light to every work table was a primary consideration in the lay-out of the rooms, which required to be warmed to a suitable temperature to allow of the employees sitting to their work with a reasonable degree of comfort.

Erected at a time of abnormally high prices of both material and labour, the attention of the architect, Mr. J. G. West, M.B.E., Senior Architect, H.M. Office of Works, was directed towards economy from the outset. Not only were the materials of construction—steel and concrete—chosen for their comparative cheapness, but a systematic attempt was made to design the whole building in accordance with scientific economy, both of first cost and of maintenance. Standardisation of parts was resorted to wherever possible, and the simple facts of the case are allowed to express themselves to a far greater extent than is usual in British architecture. The results of this frank outlook are extraordinarily fine, and a visit to the building is an education in the artistic value of common sense applied to architecture. As far as possible, the rooms for the staff have been kept large and undivided, though the stanchions upholding the floors in the interior of the building have been placed off the axis line in order that central corridors may be provided if required at any future time. At present the rooms are large and fairly lofty halls supported by a steel framework of stanchions and R.S.J. spaced in bays of 10 ft. 6 in., with floors filled in with Siegwart beams. External cavity walls were formed of two thicknesses of concrete blocks. The floors are screeded level on top and lino is laid direct on this cement float.

All the steelwork in the interior, including conduits and heating pipes, is exposed to view, but the run of the pipes has been kept to orderly lines with attention to appearance and utility at the same time. To avoid the expense of dipping the electric conduits under every R.S.J. the Siegwart beams were raised one inch above the top flange on a bed of fine concrete and the conduits were passed through the one-inch space between the steel and the floor beams, thus saving a great deal both in labour and material. Some very great economies were effected by careful attention to detail, and experimental tests were made in some cases to ascertain the relative cost of minor points connected with the engineering supplies. By preparing holes in advance in the concrete blocks for the supports a saving of 6s. 8d. per radiator was effected over the more usual method of knocking a hole in the finished wall.

The heating and ventilation are arranged by means of a hot water radiator in the centre of each bay of external wall space under the window, with inlet gratings in addition behind the radiators. The hot water pipes are carried as vertical branches throughout the height of the several floors, so that repairs can be carried out with a minimum of inconvenience to the occupants of the building. Cutting out one vertical branch only means the loss of one radiator in each large room on each floor, whereas had the radiators been connected in horizontal series a whole room would have been cut out at one time.

The hot water main circulates the building in ducts below the ground floor with removable concrete slab covers kept clear of the lino covering by being placed like a border along the walls of the several rooms. Hot water is provided for the circulation by means of a boiler-house in an independent building of similar construction in the rear of the main block, where three 28 ft. John Thompson Lancashire boilers have been converted for use as water heaters. The water is not normally heated above 180 deg., but the boilers are provided with safety valves against the accidental production of steam pressure. The circulation is assisted by means of an electric motor pump, which drives the hot water through 8 in. flow and return mains lagged with asbestos and bound with wire mesh.

A separate vertical boiler with cylinder for storage has been installed for hot water for domestic purposes and for draw-offs in the lavatories, where one hot-water point is supplied over a sink adjoining each range of basins, these being served with cold water only. For the canteen building, where a great deal of the cooking is done with steam, two vertical steam boilers have been provided with two Worthington's steam pumps for injecting water into the boilers.

Another separate building contains the canteen with seating accommodation for 1,200 persons and the canteen kitchen, which is fitted up with steam jacketed boilers, steam ovens, and hot-water plate-washers with electric motors. An ingenious rotary potato peeler is actuated by an electric motor, the skin being removed by contact with the roughened sides and floor of the container against which the potatoes are pressed by centrifugal force as the machine whirls round. The minute fragments of skin are removed through a central outlet in the bottom of the container by means of a stream of water discharging into a gully protected by a fine wire grating. Several gas-heated hot-plates, grillers and gas ovens are used in addition to those heated by steam. The servery lobby between the kitchen and canteen is screened by a dwarf partition of concrete slabs to the height of seven or eight feet, and is provided with two long steel hot plates and closets, a buffet and service counters, one of them provided with a machine for allotting portions of tea to different sizes of pot by one, two, or three turns of the handle. A soda fountain has been installed in one corner of the canteen, but the bad weather of the present summer has prevented such a brisk turnover as in other parts of the canteen, where the total business done shows signs of working out at the rate of something like forty or fifty thousand pounds a year.

The canteen hall is constructed in the same manner as the main building, with the steelwork exposed and painted grey with the enclosing concrete walls distempered buff. The roofs are flat with raised portions in the middle of the building, where a clerestory effect has been arranged with a row of windows all round the edges of each raised portion of the roof. The effect is very cheerful and pleasant, the solid flat roofs preventing the wan and watery gleam that generally comes through a top light in our climate. The electric lighting is provided in semicircular white opal glass bowls, but these had been covered with red crinkled paper on the occasion of some festive evening, when the removable tables are packed up and the broad expanse of floor served admirably for dancing.

In the offices of the main building lighting is arranged by the use of large sash windows in each bay during the daytime and artificial light is provided on the semi-indirect system by means of electric lamps contained out of sight from below in large semicircular opal bowls suspended about two feet below the ceiling. The quality of light was made the subject of considerable experiment and the fittings chosen in accordance with medical advice. The ceilings and upper parts of the walls are distempered to a creamy white, the lower parts being coloured buff to produce a reflecting surface and diffuse light and economise current. The opal bowls are only illuminated to a sufficient degree to produce a mild and pleasant glow, thus avoiding the possibility of hurting the eyes by glare. The light on the worktables is well-nigh perfect, for no shadows are thrown although ample illumination is provided.

Cheaper Electric Light.

The Stoke Newington Borough Council has made a further reduction of a halfpenny per unit for electric light, making a reduction since June last from 7d. to 6d. for lighting, and 2½d. to 1½d. for domestic heating and cooking, and a reduction of a halfpenny for power.

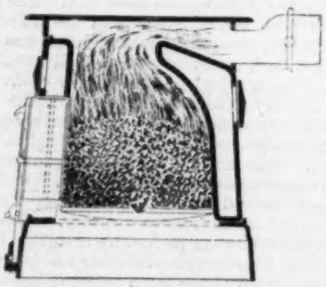
RECENT DEVELOPMENTS IN HEATING AND COOKING APPARATUS.

THE "GLOW-WORM" BOILER.

This boiler has been designed to meet the demand for a small and inexpensive boiler to provide a constant supply of hot water suitable for fixing in the kitchen or scullery, where it occupies only a small space.

The boiler is made of cast iron; the waterways are specially constructed to form a baffle,

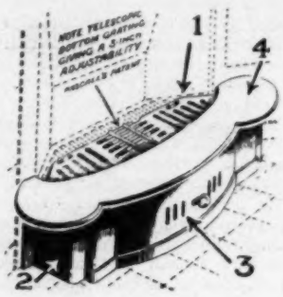
resulting in the maximum of heat being transmitted to the water, while the hot gases are directed by the baffle to traverse the underside of the hob, making it an effective hot plate. It will burn broken coke, coal or anthracite, and will also consume household refuse. The fire is always visible. If desired, an open fire is obtained by dropping the door, and the latter will then provide a trivet upon which flat irons can be heated at the open fire. The large hot plate



is useful for boiling kettles and for simple cooking operations. The boiler will give an output of 42 gals. per hour, which is sufficient for a bath and four taps, and also providing, if required, for a small heating system, radiators, towel rail and coil in linen cupboard. With the use of the hopper the fire will keep alight all night. The apparatus is supplied by Messrs. O. Bruster & De Launoit, of 4, Lloyd's-avenue, E.C.3.

"BEWTY" FIRE-FRONTS.

"Bewty" fire-fronts, manufactured by the Interoven Stove Co., Ltd., London, are scientifically constructed fittings permitting of a well-spread, shallow fire, burning slowly under controlled draught and freely radiating every unit of heat contained in the fuel. They are specially designed to enable any person easily to transform wasteful grates. "Bewty" fire-fronts ensure the maximum of heat radiation from a minimum amount of fuel. Such slow combustion is obtained that the quantity of coal used is often reduced to less than half. The fronts of old stoves need not be drilled or altered beyond removal of bars, or in some cases where the bottom grating is badly worn or too high, it may be necessary to remove same. The "Bewty" fire replaces the old bottom grate in most cases, but, if not sufficiently deep, a stool grate to fit at back can be provided at a small extra charge.



The "Bewty" minor fire-fronts are of a lighter pattern, without the tall side standards and legs.

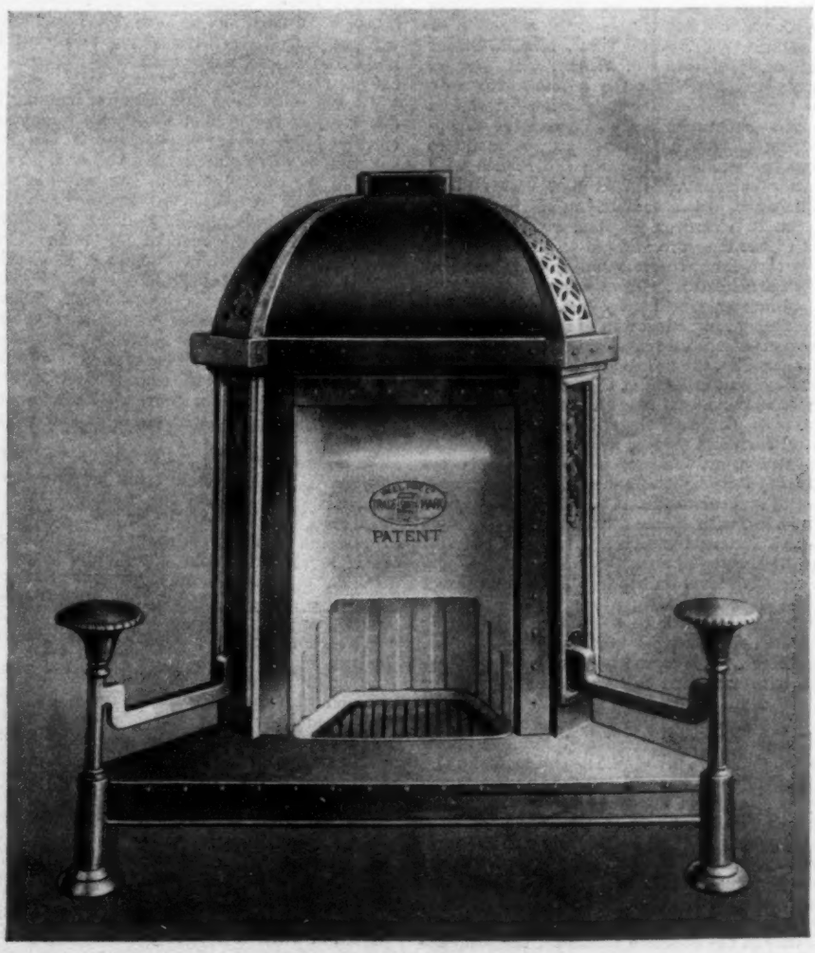
WELL FIRES.

The Well Fire and Foundry Co., Ltd., has recently introduced their well-known "Bowes" well fire in canopied dog grate form, and one of many period designs is illustrated below. This grate has been designed by Mr. Joseph Hill, F.R.I.B.A., and special features of it are that it has a double ventilating canopy and the whole of the casings and base of grate are lined with asbestos, which greatly increases the radiating efficiency of this fire.

NEW PATTERN BOILER.

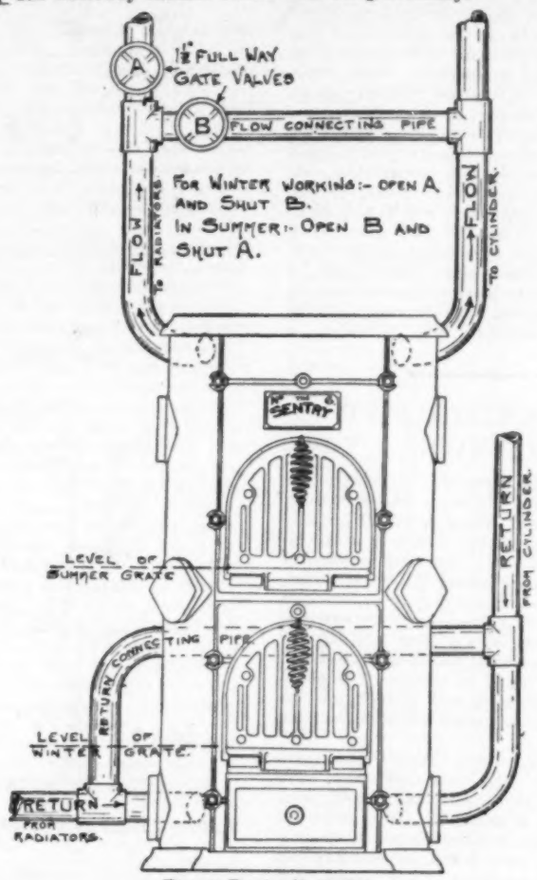
The "Sentry Duplex" No. 6 boiler, illustrated on p. 467, is a new design of hot-water boiler produced by Messrs. Wood, Russell & Co., of 34, Oxford-street, W.1. The following advantages are acquired from this type of boiler:—(1) A constant temperature is maintained in the heating system, irrespective of demands made on the domestic supply; (2) the efficient domestic hot water supply is direct from the boiler and is of higher temperature than obtainable by an indirect method of heating; (3) the heating system is entirely free from the sediment which in many localities collects in the domestic supply system; (4) for summer work, the size of the boiler and the fire are reduced, so as to be commensurate with the demand made by the hot-water supply only; (5) the heating system is kept charged through the hot-water supply system, and the employment and maintenance of a separate cistern and ball-valve is rendered entirely unnecessary.

These results are obtained by the special design of the boiler, which is so constructed as to operate as two entirely separate boilers; these can be combined at will to operate as a single boiler. Externally the new boiler presents generally the appearance and embodies all the features of the well-known "Sentry" boilers, of the ordinary pattern; the fire is always visible through large and protected mica windows; the boiler can be operated with an open fire if desired; the furnace doors are designed to act as trivets when open, and a large hot plate is always available for cooking. The new boiler has a heating capacity sufficient for 125 sq. ft., and at the same time will supply 70 gals. of water at bath temperature per hour. This output is obtainable with broken gas coke, anthracite, or a mixture of coke and coal can also be used, and the boiler will also consume



The Well Fire Grate.

all the combustible domestic refuse. Owing to the arrangement of the smoke outlet and the pipe connections the back of the boiler can be placed close up to a wall and at the same time close to objects on both sides. This renders it particularly suitable for installations where space is limited. The waterway extends below the firebars to allow any sediment to fall to the coolest part of the boiler, whence it can be removed through the cleaning covers conveniently placed for the purpose. To facilitate clean stoking a special fuel funnel is provided free of charge with each boiler.



The "Duplex" Boiler.

NEW PATTERN FIREPLACE.

A new type of fireplace (illustrated below) has been put on the market by Messrs. Bratt Colbran & Co., 10, Mortimer-street, London, W.1. It is claimed that this fire, in addition to being easily installed and readily adaptable to existing chimney-pieces, increases the scope of the architect in designing surrounds and mantels. It is also claimed that as the fire is not sunk the danger of hidden woodwork becoming ignited is eliminated. The draught is regulated by an economiser, and when this is shut the fire largely consumes its own smoke, no underground channels for the admission of air being necessary.

NEW COMPANIES.

The particulars quoted below have been compiled by Messrs. Jordan & Sons, Ltd., Company Registration Agents, of 116 & 117, Chancery-lane, W.C.2, from the documents available at the Companies' Registry.

UNITY BUILDERS & DECORATORS CO., LTD. (183,884). Registered August 21. 36, Talfourd-road, Peckham, S.E.15. The Unity Builders and Decorators Co., now carried on by Thomas Alfred Leach at 36, Talfourd-road, Peckham. Nominal capital, £2,000.

C. J. KERRIDGE & SON, LTD. (183,889). Registered August 21. Builder, decorator and contractor, now carried on by Clarence James Kerridge at 4, Newtown-road, Hove. Nominal capital, £3,000.

HENRY HAWKINS, LTD. (183,909). Registered August 22. Manufacturers of bricks, tiles, pipes, &c. Nominal capital, £7,500.

TELLING BROTHERS, LTD. (183,926). Registered August 22. Artificial stone manufacturers and specialists, and plastering contractors. Nominal capital, £16,000.

W. WADE & CO., LTD. (183,945). Registered August 23. 43, St. John's-grove, Leeds. Builders and contractors, &c. Nominal capital, £1,000.

BANKART & WAITE, LTD. (183,970). Registered August 25. 27, Yorkersgate, Malton, Yorkshire. Architects, surveyors, engineers, and designers of buildings or parts thereof. Nominal capital, £2,000.

PORTLAND CEMENT COMPANY "NESHER," LTD. (184,085). Registered August 31. Manufacturers of or dealers in Portland cement. Nominal capital £30,000.

TRADE NEWS.

We have received a small booklet on Marseilles roofing tiles, which has been specially issued for builders. If any of our readers would like a copy, Messrs. Langley London, 161, Borough High-street, London (the sole selling agents), will send one on receipt of request.

It is claimed for the "Universal" steel cupboard manufactured by Messrs. G. A. Harvey & Co. (London), Ltd., Woolwich-road, S.E.7, that it combines strength and security, and is proof against fire, rot, damp, and vermin. Size 72 in. by 24 in. by 18 in. is fitted with three-lever English lock and is finished in stove enamel of olive green shade.

What is claimed to be the biggest and most brilliant advertising sign in the United Kingdom has just been erected on the "Mazda" electric lamp factory at Rugby. This sign measures 33 ft. by 22 ft., and consists of opal glass-faced letters on a steel framework bolted to the factory roof. Instead of being lighted by a number of small lamps fixed to the sign itself, it is illuminated from a distance by means of B.T.-H. floodlight projectors equipped with "Mazda" gas-filled lamps.

We have received from Messrs. Wm. Wadsworth & Sons, Ltd., Bolton, a booklet giving particulars of the firm's transporter. Described in a Home Office report as "an admirable appliance," the transporter was designed to facilitate the loading or unloading of wagons, barges, drays, &c., and dispense with the difficult, slow, and laborious practice of swinging goods in or out of a room, a very dangerous practice indeed, especially in high buildings. The transporter will lift goods off the vehicle and take them inside the building, and *vice versa* pick up goods inside the room, travel them outside and lower them as required. The carriage can be stopped at any point by the operator. The transporter can be arranged to travel any distance in a straight line. One belt or rope will drive it, or an electric motor can be geared direct. It is built in sizes ranging from 3 cwt. to 80 cwt., and any speed can be arranged. The gear is a fixture, and can be hung from roof principals, walls, or carried on stanchions built up from the floor.

The Pulsometer Engineering Co., Ltd., Reading, have put on the market a high-speed reciprocating pump in four sizes from 250 to 2,000 imperial gallons per hour for heads up to 100 feet. The high speed of these pumps, 300 to 500 revolutions per minute, makes it possible to drive them by belt or gearing from any motor running at any speed. The pumps are fitted with the "Pulsometer" patent silent valves, which render the working absolutely noiseless, and as the moving parts are entirely enclosed the pump is perfectly clean and could be placed anywhere in a private house.

We have received from Messrs. Samuel Smith & Sons, Ltd., Beehive Foundry, Smethwick, particulars of their patent Foresight range. Among the advantages enumerated are that it reduces the fuel bill by 50 per cent, and is easily and quickly converted from a cooking range into an open fire.

An interesting illustrated brochure is to hand, showing how the well-known Beer stone is obtained from the quarries in Devonshire, and also illustrating some churches and church decoration in which it has been used, including the Norwich Catholic Cathedral Church (the late Sir Gilbert Scott, architect), the high altar and reredos at Hawkesyard Priory, and the high altar at the Cathedral Priory, and the high altar at the Catholic Church, Exeter. Stone has been excavated from these quarries for over a thousand years, and the brochure gives some good illustrations of the Grandison Tombs at Ottery St. Mary, executed in Beer stone in 1360, and the Beer stone Norman doorway at Axminster Church. This limestone is of a good white colour, and may be obtained in blocks without fissures of a size only limited by the means of handling. The proprietors of the quarries are Messrs. The Beer Stone Co., Ltd.

THE BUILDING TRADE.

VIBRATION AND BUILDINGS AND MOTOR TRAFFIC.

In our issue for February 11, 1921, we noted a case in which the proprietors of an eating house were held liable for personal injuries to a customer from the fall of a ceiling, although no absolute negligence was proved. There is a warranty to guests that the premises shall be as safe as reasonable skill and care can make them, and the Judge found that ceilings did not fall if due care was taken when they were put up and repaired, but we suggested that a ceiling might well fall without any negligence or lack of care on the part of anyone owing to the vibration caused by the heavy motor traffic.

According to *The Times*, of September 12, an inquiry is being held at Cowes, Isle of Wight, by an Inspector of the Ministry of Transport on the application of the County Council, for an order to limit the speed of motor vehicles on certain roads in the town.

Evidence, it would seem from the report, was given by the applicants that the vibration of heavy motor cars and coaches accelerated the natural movement of yielding clay subsoil towards the sea with the result that extensive damage was being done to house property. It was stated that walls and ceilings were cracked, marble mantelpieces were broken, pictures were shaken from the walls and glasses and decanters from sideboards. For the motor transport proprietors it was contended that the damage arose from the drought of last year and from the roads not being equal to the demands made upon them.

The report has not been made by the Inspector at present, and we only refer to the evidence in this inquiry as supporting the view we expressed in 1921, that the increased weight in motor vehicles raised some very important considerations in regard to buildings, and especially in connection with the liability imposed on those who invited guests on their premises in the case of hotels and similar places.

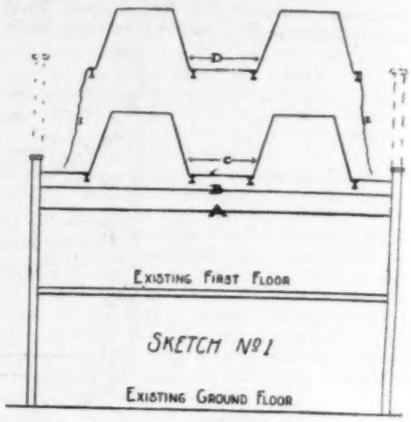
Very heavy char-a-bancs are running all over the country and through towns where the buildings are not constructed to stand this heavy vibration. This new heavy traffic on roads is each year becoming more the normal traffic to be expected, and in the case of new buildings they must be constructed to stand normal strain. What is the position of the owners of old houses? If the traffic comes to be considered normal, presumably they must render their houses fit to stand modern normal conditions, but this does not conclude the matter. From the evidence offered at the inquiry referred to above the motor owners do not appear to have contested the fact of damage having occurred, but ascribe it, amongst other causes, to the condition of the roads for which the local authorities would be liable. The question of speed and its uniform regulation also arises in this connection. The points raised are of extreme importance to local authorities, householders and ratepayers, and the result of the inquiry will be awaited with considerable interest.

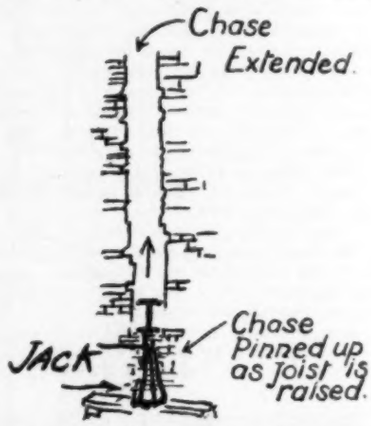
ROOF RAISING AT BRIXTON.

We illustrate the operation of raising the roofs at Bon Marché, Brixton, which is being carried out by Messrs Wood & Co., 91, Stockwell-road, S.W.9, under the direction of Mr. H. Payne Wyatt, architect. The work consists of raising three roofs, approximately 6,000 ft. super., a matter of 16 ft. A temporary ceiling and working scaffold being fixed at A enabled the contractors to insert a new steel and timber floor at B from which they jacked up the existing roof and lanterns at C to their new level D. Tarpaulin valances at 1 and 2 took off the water into the original gutter left behind at the lower level.

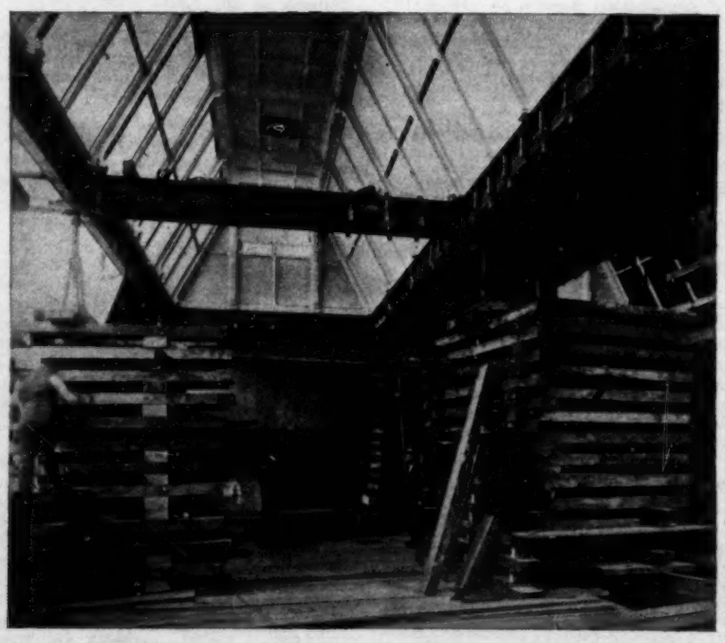
The steel joists, which formed the main frame work of the roofs were freed from their bearings on the party-walls and chases were extended upwards as sketch 2. Jacks were put under the joists in 24 different points and the whole three roofs were raised by simultaneous action. As the joists rose in the chases they were pinned up underneath. Each hoist took the roof up about 12 in.; the packing employed was square sawn main line sleepers, which were more rigid than the ordinary adzed sleepers.

The photograph shows one of the three roofs where the plaster was removed, but in the cases of the other two the plastering and enrichments were preserved intact. The external walls were built up in the ordinary way. The reason of the whole operation was to save the expense of a temporary tarpaulin roof over such a large area, and it also saved removing and refixing roofs piece-meal.





Lifting a Roof at Brixton. (Sketch No. 2.)



Lifting a Roof at Brixton.

NEW BUILDINGS IN LONDON.

ALPERTON.—Preliminary excavations are now being made in connection with the rebuilding of "The Pleasure Boat," licensed house in Ealing-road, for the owners, the Cannon Brewery Co., Ltd., of 160, St. John-street, E.C. 1. The proposed building will have two floors and a frontage of 50 ft. and a depth of 52 ft. The plans have been prepared by Mr. Eaves, of Uxbridge. The general contract is being carried out by Messrs. Fassnidge & Son, of Uxbridge.

WHITECHAPEL.—Nos. 2, 3 and 4, High-street, having been demolished, a new block of buildings is now being erected, with a frontage of about 40 ft. and a depth of 65 ft. Nos. 2 and 3 are the property of Messrs. Scales & Leuw, wholesale meat salesmen, who will occupy the ground floor and basement, the upper four floors being available for offices. No. 4 is owned by Mrs. Mercado, wholesale confectioner. The construction is ferro-concrete and brickwork, with stone-faced terra-cotta, and green slate mansard roof. The architect is Mr. H. A. Porter, A.R.I.B.A., of 22, Surrey-street, Strand, and the general contractors are the Seymour Construction Co., 2, East-street, Barking, Essex. The sub-contractors are: Terra-cotta, Messrs. Edwards, of Ruabon; ferro-concrete, Messrs. Stuarts Granolithic Co., of Lincoln's Inn Fields;

window casements, Messrs. J. Gibbons, Southampton-row, W.; asphalte, the Excel Asphalte Co., Hammersmith. Other sub-contracts are not yet let.

EUSTON-ROAD.—The Edwards Construction Co., 5, Victoria-street, London, S.W.1, are making temporary extensions and alterations at the Euston-road Fire Brigade Station, for the L.C.C. We understand that only the steel sub-contract has been let.

WATERLOO.—An extension of the Royal Waterloo Hospital, erected in 1902, at the corner of Waterloo-road and Stamford-street, is now in progress. The object of the extension is to give additional accommodation for the increased demands on the out-patients' department and to provide a nurses' home, the nurses at present being housed in temporary premises some distance away. The whole of the out-patients' department has been re-arranged and brought up to date, and the extension provides for X-ray treatment, massage room, new out-patients' operating theatre, and a fully-equipped dispensary. The total expenditure contemplated is about £70,000, and the cost of the portion now completed has amounted to about £25,000. The architects are Messrs. Waring & Nicholson, who were the architects for the original building. The contractors are Messrs. Holliday & Greenwood, Ltd., and the clerk of works, Mr. Langham. The constructional steelwork has been supplied by Messrs. Matt. T. Shaw & Co. The terra-cotta and sanitary fittings are by Messrs. Doulton & Co., Ltd. Tiling has been used for the walls of the out-patients' department and the floors are laid with Messrs. Walters & Co.'s patent jointless flooring. The heating engineers are Messrs. Davey & Roberts, and the electrical installation has been carried out by Messrs. Langston Jones & Co.

NEW RAILWAY STATION.—According to the *Morning Post*, the reconstruction of the Farringdon and High Holborn station of the Metropolitan Railway is to be commenced almost immediately. The new station will comprise two distinct floors, the lower consisting of a complete range of shops, booking offices, parcel offices, cloak-rooms, buffet, &c.; while the whole of the upper floor will be laid out as an up-to-date restaurant capable of accommodating more than 100 persons.

LEADENHALL STREET.—The premises, No. 80, Leadenhall-street, were originally the old "Bull's Head," and are being extensively altered for use as a restaurant and wine bar for the City of London Brewery Co. The work has chiefly consisted in the removal of all the internal walls and partitions, part of rear wall, and the insertion of R.S.J.'s, &c., to carry the floors and walls. The alterations include new addition at rear; provision of teak staircases; electric double service lift; part reconstruction of upper front and new window openings; new teak and granite lower front; all new teak internal fittings to the two restaurant floors and bar; formation of kitchens, scullery, &c., on upper floors, gas being used as fuel for all cooking and water heating purposes. The architect is Mr. G Gordon Stanham, of Bush-lane E.C. The sub-contractors are as follows: Lift, Messrs. Aldous & Campbell, Ltd.; granite work, Messrs. Fenning & Co.; steelwork, the Aston Construction Co., Ltd.; electric lighting, Messrs. Lock & Soares; and fire-resisting glazing, The British Challenge Glazing Co. The whole of the teak fittings and joinery, plumbing, and general works is by Messrs. Hawkey & Oldham, London. The contract sum amounts to £3,147.

NOTTING HILL.—Mr. J. P. Williams is carrying out structural alterations to the Notting Hill Gate branch of Messrs. David Grieg, Ltd. A new roof is being fitted, and there will also be interior alterations. The plans have been prepared by Mr. Holmes, the firm's own architect. We are informed that the sub-contracts have been let.

ILFORD.—In connection with the proposed new branch of the London County Westminster and Parr's Bank, Ltd., at Ilford, Mr. J. H. Cheston, of 3, Tudor-street, has been appointed architect, but the general contract and sub-contracts have not yet been allocated.

RATES OF WAGES IN THE BUILDING TRADE.

The following are the rates of wages in the building trade in England and Wales. Every endeavour is made to ensure accuracy, but we cannot be responsible for errors that may occur:—

	Masons	Bricklayers.	Carpenters, Joiners.	Plasterers	Slaters.	Plumbers.	Painters.	Masons' Labourers.	Bricklayers' Labourers.	Plasterers' Labourers.
Aberdare	1/8	1/8	1/8	1/8	1/8	1/8	1/8			1/3
Accrington	1/8	1/8	1/8	1/8	1/8	1/8	1/8			1/3
Alfreton	1/8	1/8	1/8	1/8	1/8	1/8	1/8			1/3
Ashton-under-Lyne	1/8	1/8	1/8	1/8	1/8	1/8	1/8			1/3
Barnsley	1/8	1/8	1/8	1/8	1/8	1/8	1/8			1/3
Barrow-in-Furness	1/8	1/8	1/8	1/8	1/8	1/8	1/8			1/3
Barry	1/8	1/8	1/8	1/8	1/8	1/8	1/8			1/3
Bath	1/5	1/5	1/5	1/5	1/5	1/5	1/5			1/0½
Bedford	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½			1/0½
Birkenhead	1/10	1/10	1/10	1/10	1/10	1/10	1/10			1/3½
Birmingham	1/8	1/8	1/8	1/8	1/8	1/9	1/8			1/3
Bishop Auckland	1/8	1/8	1/8	1/8	1/8	1/8	1/8			1/3
Blackburn	1/8	1/8	1/8	1/8	1/8	1/8	1/8			1/3
Blackpool	1/8	1/8	1/8	1/8	1/8	1/8	1/8			1/3
Bolton	1/8	1/8	1/8	1/8	1/8	1/8	1/8			1/3
Bournemouth	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½			1/0½
Bradford	1/8	1/8	1/8	1/8	1/8	1/8	1/8			1/3
Bridgwater	1/3½	1/3½	1/3½	1/3½	1/3½	1/3½	1/3½			0/11½
Brighton	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½			1/0½
Bristol	1/8	1/8	1/8	1/8	1/8	1/8	1/8			1/3
Burnley	1/8	1/8	1/8	1/8	1/8	1/8	1/8			1/3
Burton-on-Trent	1/6½	1/6½	1/6½	1/6½	1/6½	1/6½	1/6½			1/2
Bury	1/8	1/8	1/8	1/8	1/8	1/8	1/8			1/3
Cambridge	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½			1/0½
Cardiff	1/8	1/8	1/8	1/8	1/8	1/8	1/8			1/3
Chatham	1/4	1/4	1/4	1/4	1/4	1/4	1/4			1/0
Chelmsford	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½			1/0½
Cheltenham	1/5	1/5	1/5	1/5	1/5	1/5	1/5			1/0½
Chester	1/8	1/8	1/8	1/8	1/8	1/8	1/8			1/3
Chesterfield	1/8	1/8	1/8	1/8	1/8	1/8	1/8			1/3
Colchester	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½			1/0½
Coventry	1/8	1/8	1/8	1/8	1/8	1/8	1/8			1/3
Crewe	1/6½	1/6½	1/6½	1/6½	1/6½	1/6½	1/6½			1/2
Darlington	1/8	1/8	1/8	1/8	1/8	1/8	1/8			1/3
Derby	1/8	1/8	1/8	1/8	1/8	1/8	1/8			1/3
Doncaster	1/8	1/8	1/8	1/8	1/8	1/8	1/8			1/3
Dudley	1/6½	1/6½	1/6½	1/6½	1/6½	1/6½	1/6½			1/2
Durham	1/8	1/8	1/8	1/8	1/8	1/8	1/8			1/3
E. Glam. (Mon. Vall.)	1/8	1/8	1/8	1/8	1/8	1/8	1/8			1/3
Eastbourne	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½			1/0½
Exeter	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½			1/0½
Folkestone	1/4	1/4	1/4	1/4	1/4	1/4	1/4			1/0
Gloucester	1/5	1/5	1/5	1/5	1/5	1/5	1/4			1/0½
Grantham	1/6½	1/6½	1/6½	1/6½	1/6½	1/6½	1/6½			1/2
Grays	1/8	1/8	1/8	1/8	1/8	1/8½	1/7			1/3
Grimsby	1/8	1/8	1/8	1/8	1/8	1/8	1/8			1/3
Great Yarmouth	1/4	1/4	1/4	1/4	1/4	1/4	1/4			1/0
Guildford	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½			1/0½
Halifax	1/8	1/8	1/8	1/8	1/8	1/8	1/8			1/3
Harrogate	1/8	1/8	1/8	1/8	1/8	1/8	1/8			1/3
Hartlepools	1/8	1/8	1/8	1/8	1/8	1/8	1/8			1/3
Hastings	1/4	1/4	1/4	1/4	1/4	1/4	1/4			1/0
Hereford	1/5	1/5	1/5	1/5	1/5	1/5	1/4			1/0½
Huddersfield	1/8	1/8	1/8	1/8	1/8	1/8	1/8			1/3
Hull	1/8	1/8	1/8	1/8	1/8	1/8	1/8			1/3
Ipswich	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½			1/0½
Lancaster	1/8	1/8	1/8	1/8	1/8	1/8	1/8			1/3
Leamington Spa	1/6½	1/6½	1/6½	1/6½	1/6½	1/6½	1/6½			1/2
Leeds	1/8	1/8	1/8	1/8	1/8	1/8	1/8			1/3
Leicester	1/8	1/8	1/8	1/8	1/8	1/8	1/8			1/3
Lichfield	1/6½	1/6½	1/6½	1/6½	1/6½	1/6½	1/6½			1/2
Lincoln	1/8	1/8	1/8	1/8	1/8	1/8	1/8			1/3
Liverpool	1/10	1/10	1/10	1/10	1/10	1/10	1/10			1/3½
Llanelly	1/8	1/8	1/8	1/8	1/8	1/8	1/8			1/3
London	1/8	1/8	1/8	1/8	1/8	1/8½	1/7			1/3
Loughborough	1/8	1/8	1/8	1/8	1/8	1/8	1/8			1/3
Luton	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½			1/0½
Maidstone	1/4	1/4	1/4	1/4	1/4	1/4	1/4			1/0
Manchester	1/8	1/8	1/8	1/8	1/8	1/8	1/8			1/3
Mansfield	1/8	1/8	1/8	1/8	1/8	1/8	1/8			1/3
Merthyr Tydfil	1/8	1/8	1/8	1/8	1/8	1/8	1/8			1/3
Middlesbrough	1/8	1/8	1/8	1/8	1/8	1/8	1/8			1/3
Newcastle-on-Tyne	1/8	1/8	1/8	1/8	1/8	1/8	1/8			1/3
Newport, Mon.	1/8	1/8	1/8	1/8	1/8	1/8	1/8			1/3
Northampton	1/6½	1/6½	1/6½	1/6½	1/6½	1/6½	1/6½			1/2
Norwich	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½			1/0½
Nottingham	1/8	1/8	1/8	1/8	1/8	1/8	1/8			1/3
Oakham	1/5	1/5	1/5	1/5	1/5	1/5	1/5			1/0½
Oldham	1/8	1/8	1/8	1/8	1/8	1/8	1/8			1/3
Oxford	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½			1/0½
Plymouth	1/6	1/6	1/6	1/6	1/6	1/6	1/5			1/1½
Pontypridd	1/8	1/8	1/8	1/8	1/8	1/8	1/8			1/3
Portsmouth	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½			1/0½
Preston	1/8	1/8	1/8	1/8	1/8	1/8	1/8			1/3
Reading	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½			1/0½
Rochdale	1/8	1/8	1/8	1/8	1/8	1/8	1/8			1/3
Rochester	1/4	1/4	1/4	1/4	1/4	1/4	1/4			1/0
Rugby	1/6½	1/6½	1/6½	1/6½	1/6½	1/6½	1/6½			1/2
St. Albans	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½			1/0½
St. Helen's	1/8	1/8	1/8	1/8	1/8	1/8	1/8			1/3
Scarborough	1/6½	1/6½	1/6½	1/6½	1/6½	1/6½	1/6½			1/2
Sheffield	1/8	1/8	1/8	1/8	1/8	1/8	1/8			1/3
Shrewsbury	1/6½	1/6½	1/6½	1/6½	1/6½	1/6½	1/6½			1/2
Southampton	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½			1/0½
Southend-on-Sea	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½			1/0½
Southport	1/8	1/8	1/8	1/8	1/8	1/8	1/8			1/3
South Shields	1/8	1/8	1/8	1/8	1/8	1/8	1/8			1/3
Stockport	1/8	1/8	1/8	1/8	1/8	1/8	1/8			1/3
Stockton-on-Tees	1/8	1/8	1/8	1/8	1/8	1/8	1/8			1/3
Stoke-on-Trent	1/8	1/8	1/8	1/8	1/8	1/9	1/10			1/0½
Stroud	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½	1/4			1/3
Sunderland	1/8	1/8	1/8	1/8	1/8	1/8	1/8			1/3
Swansea	1/8	1/8	1/8	1/8	1/8	1/8	1/8			1/0½
Swindon	1/5	1/5	1/5	1/5	1/5	1/5	1/4			1/0½
Taunton	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½			1/0½
Torquay	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½			1/0½
Tunbridge Wells	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½			1/3
Wakefield	1/8	1/8	1/8	1/8	1/8	1/8	1/8			1/2
Walsall	1/6½	1/6½	1/6½	1/6½	1/6½	1/6½	1/6½			1/3
Warrington	1/8	1/8	1/8	1/8	1/8	1/8	1/8			1/3
West Bromwich	1/8	1/8	1/8	1/8	1/8	1/8	1/8			1/3
Wigan	1/8	1/8	1/8	1/8	1/8	1/8	1/8			1/0½
Windsor	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½			1/3
Wolverhampton	1/8	1/8	1/8	1/8	1/8	1/8	1/8			1/3
Worcester	1/6½	1/6½	1/6½	1/6½	1/6½	1/6½	1/6½			1/2
York	1/6½	1/6½	1/6½	1/6½	1/6½	1/6½	1/6½			1/2

(For rates of wages in the Building Trade in Scotland, see page 471.)

GLASGOW CORPORATION HOUSING AND HEALTH EXHIBITION.

THE fourth Housing and Health Exhibition organised by the Glasgow Corporation will be opened in the Kelvin Hall, Glasgow, on October 2, and will continue until the 21st. For all interested in housing and health this exhibition will be the centre of attraction. The Corporation are decidedly fortunate in having such a large hall for an exhibition of the kind, and they are showing commendable enterprise and initiative with this, as with every new venture they undertake.

This exhibition, like the other three already held, will give the public an opportunity of seeing everything connected with housing and the home in its most up-to-date form, and as the floor space has been readily booked up by firms representing almost every branch of the building trades, should prove of great commercial value to the exhibitors. The shortage of houses is still very acute in Glasgow, as is shown by the official figures of the Corporation. They are building 5,000 houses for which there are 20,000 applicants, and annually there are 6,000 newly-married couples joining in the almost futile search for a "hame o' their ain."

As usual the various Corporation departments will be well represented, but a new venture will be made by installing in connection with the Public Health Department a crèche with 28 to 30 children under the care of a staff of trained nurses. Apart altogether from the commercial value of the exhibition, it is apparent that the Corporation are fully alive to the difficulties of their position, for, like other large cities, slum removal is one of their knotty problems. They are quite well aware that the demand for houses far exceeds the supply, hence the removal of slums is retarded. However, the æsthetic and educative value of this and the other exhibitions should bear fruit as that demand is met, and, may we add, if the Corporation schemes meet with the measure of success they deserve, the day is not far distant when the people will be able to say they have a "Home"—not a house—to go to. This is the motive underlying the exhibition, to bring into being healthy "homes of peace and contentment" to displace the filth and degradation of the slums.

Builders on the Gold Coast

[This photograph shows workmen engaged in laying "Ebnerite" jointless flooring, at a New Hospital and Public Buildings, at Accra, Gold Coast, the architect of which is Mr. W. Gamon; and the contractors, Messrs. Thomas & Edge, London.]

THE MAKING OF PORTLAND CEMENT.

ON Saturday last, by the courtesy of Messrs. J. B. White Brothers, of the Associated Portland Cement Manufacturers, Ltd., a party of over 60 members of the Metropolitan and Kent branches of the Architects' and Surveyors' Assistants' Professional Union visited the company's works at Swanscombe, Kent, where nearly 1,000 tons of cement are turned out daily.

Beginning at the chalk pits, the first stage is to get rid of the superincumbent earth, which varies in thickness from 1 to 20 ft., and is either excavated with steam shovels or washed away by a powerful hydraulic jet. The next stage is the getting of the chalk, about 2,000 tons of which are excavated daily and transported by a light railway to the crusher. From this it drops on to an endless band and is conveyed to the wash-mills, where it is mixed with water and joins a similar stream of clay and water pumped through a 6-in. main from the clay pits two miles away. The proper amalgamation of the chalk and clay in fixed and definite proportions with about 43 per cent. of water is effected by perforated iron revolving plates, the mixture or slurry being forced through a series of tanks and sieves until it leaves the finishing or screening mill in such a fine state that from 95 to 97 per cent. will pass through a sieve having 32,400 holes per sq. in.

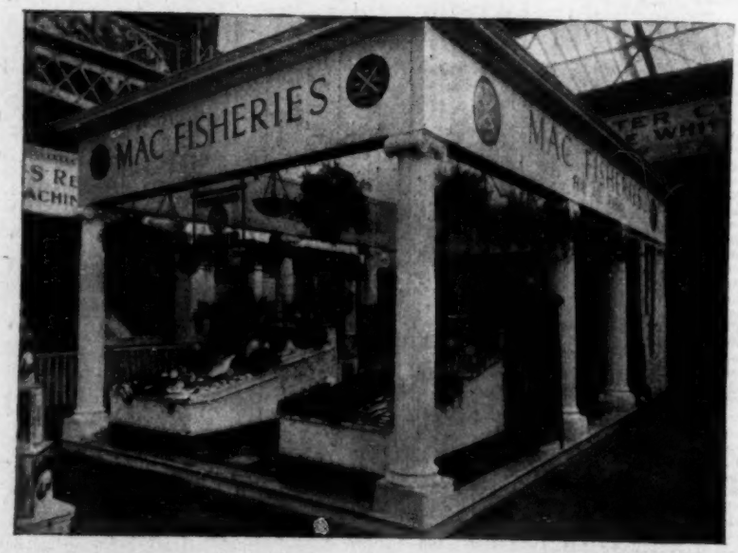
By an ingenious combination of sumps, pumps, and Archimedean screws, the "grit" is completely separated from the slurry.

Chemical tests of the slurry are made every half-hour and to secure the greatest possible uniformity in its chemical composition it passes from the finishing mills into large mixing and storing tanks (the largest holding sufficient to make 2,500 tons of cement) where it is kept continually in motion by mechanical stirrers and finally pumped into the rotary kilns. These kilns constitute the critical stage of the whole process and attracted considerable interest. They consist of a battery of 16 tubes, each about 130 ft. long and 6 feet internal diameter, fixed at an angle of about 5 deg. with the horizontal and given a slow rotatory movement. At the lower end of the tube a blast of air and powdered coal of an extreme degree of fineness produces, in effect, a blow-pipe flame with a temperature of 2,800 deg. F., at which temperature chemical combination of the dry slurry takes place, a double silicate of lime and alumina, which constitutes the principal ingredient of Portland cement, being produced in the form of a fine clinker. By this method of calcination the maximum of control can be exercised, with the object of preventing the production either of under-burnt or over-burnt clinker.

The subsequent passage of the hot clinker through the rotary cooler, and thence through the ball mill and the tube mill—where it is ground to a fine powder capable of passing through a sieve of 32,400 meshes to the sq. in.—was next demonstrated. Regulation of the setting qualities of the cement is obtained either by the addition of a small quantity of gypsum or by the injection of steam, to any desired degree, into the tube mill in the final stages of grinding, by which method every particle is subjected to a continuous and repeated process of superficial hydration.

The inspection of the huge concrete hoppers in which the cement is stored, and the cooperage where the casks for the export trade are made, brought the visit to a close. The party was much interested also in one of the chimney shafts, 250 ft. high, in reinforced concrete, which had been constructed in a fortnight.

A vote of thanks to the directors, to Mr. Cox, the secretary, and to his staff of guides and demonstrators, proposed by Mr. C. McLachlan, A.R.I.B.A., Chairman of the Executive Council of the A.S.A.P.U., and supported by Mr. E. F. Etchells, President of the Concrete Institute, was passed unanimously; suitable acknowledgments also being made, proposed by Mr. H. O. Funnell, seconded by Mr. J. Mitchell (General Secretary), to Mr. J. A. Gould (Honorary Secretary) and the Social Committee of the Metropolitan Branch for successfully organising the largest party which has ever visited the works since the war.



[This stand occupies a site, 16 ft. by 30 ft., at the Nation's Food Exhibition at Olympia. The design was prepared and the works supervised by the Premises Department of Mac Fisheries, Ltd. The fish slabs are constructed on a timber-framed structure, one being for wet and the other for dry fish. The slabs are of Sicilian marble with a 6 in. black Belgian marble skirting. The floor is 12 in. squares of "Biancola" black and white tiles with a "Biancola" natural colour tread and riser, and was carried out by Art Pavements and Decorations, Ltd. The fountain is of "Pulhamite" stone, and was erected by Messrs. Pulham & Sons.]

CONTRACTS, COMPETITIONS, &c.

For some contracts still open, but not included in this List, see previous issues. Those with an asterisk are advertised in this number. Certain conditions beyond those given in the following information are imposed in some cases, such as that advertisers do not bind themselves to accept the lowest or any tender; that a fair wages clause shall be observed; that no allowance will be made for tenders; and that deposits are returned on receipt of a bona-fide tender unless stated to the contrary.

The date given at the commencement of each paragraph is the latest date when the tender, or the names of those willing to submit tenders, may be sent in; the name and address at the end is the person from whom or place where quantities, forms of tender, &c., may be obtained.

BUILDING AND PAINTING.

SEPTEMBER 30.—**Barnsley.**—PAINTING, &c.—For the painting and decorating of certain schools in the county borough of Barnsley. Mr. H. Taylor, Borough Surveyor, Fairfield House, Barnsley.

SEPTEMBER 30.—**Blackpool.**—HOUSES, &c.—Erection of 68 houses, contained in seventeen blocks, and for house drainage and fencing respectively in connection therewith, for the T.C. Mr. Edgar D. Dennis, architect, 27, Clifton-street, Blackpool. Deposit £4 4s.

SEPTEMBER 30.—**Edinburgh.**—CONVENIENCE.—Erection of a public convenience at North Meadow Walk, for the T.C. Burgh Engineer, 1, Parliament-square, Edinburgh.

SEPTEMBER 30.—**Essex.**—SHELTER.—Erection and completion of a shelter on the Western Esplanade (at the foot of the inclined roadway), for the County Borough Council of Southend-on-Sea. Mr. Robt. H. Dyer, Borough Engineer, Municipal Buildings, Southend-on-Sea. Deposit £2.

SEPTEMBER 30.—**Harrow, Middlesex.**—GRAND STAND.—Grand stand to seat about 400 persons, supplied and erected on Sports Ground, Pinner View, Harrow, for the Old Lyonian Association. Mr. E. F. Chatham, 44, Roxborough Park, Harrow.

SEPTEMBER 30.—**Newton-le-Makerfield.**—HOUSES.—Erection of 16 type "A" houses (in brick) at the South Mesnes, Earlestown, for the U.D.C. Council's Surveyor, Town Hall, Earlestown.

SEPTEMBER 30.—**Poole.**—DRILL HALL.—Repairs and decoration at the R.G.A. Drill Hall, South-road, Poole, for the Dorset Territorial Army Association. Mr. C. W. Pike, c/o Mr. F. T. Maltby, A.M.I.C.E., M.S.A., architect, Dorchester.

SEPTEMBER 30.—**Southampton.**—SCHOOL.—Erection of a new school at Andover (with Army hutting), for the County Borough of Southampton. Mr. A. L. Roberts, County Architect, The Castle, Winchester. Deposit £1 1s.

OCTOBER 2.—**Broughton.**—HALL.—Erection of village hall. Mr. F. Henshaw, architect, Lloyds Bank Chambers, Andover. Deposit £1 1s.

OCTOBER 2.—**Douglas.**—POWER STATION.—Erection of electricity generating station, for the T.C. Mr. J. E. Teare, architect, 46, Athol-street, Douglas.

OCTOBER 2.—**Glasgow.**—HOUSES.—Erection of 226 houses at Hawthorn-street, for the T.C. Mr. J. Lindsay, Town Clerk, City Chambers, Glasgow.

OCTOBER 2.—**Hackney.**—GARAGE.—Construction of a garage in reinforced concrete, to accommodate twenty-eight electric vehicles, together with enclosures for workshop, office, stores, motor generators, &c., at Millfields-road, for the B.C. Norman Scorgie, Borough Engineer, Town Hall, Mare-street, E. 8. Deposit £1 1s.

OCTOBER 2.—**Holmfirth.**—CONVENIENCES.—Erection of public conveniences, Towngate, for the U.D.C. Messrs. Abbey & Hanson, architects, 11, Cloth Hall-street, Huddersfield.

OCTOBER 2.—**Hoole.**—HOUSES.—Erection of 12 houses, for the U.D.C. Mr. Fred Davies, architect, 14, Newgate-street, Chester.

OCTOBER 2.—**Ipswich.**—WAR MEMORIAL.—For erection and completion of memorial of hard Whitbed monumental stone in Christchurch Park, for the County Borough. Mr. Edward Adams, A.R.I.B.A., 9, Herbert-street, Whitworth Park, Manchester. Deposit £2 2s.

OCTOBER 2.—**Lichfield.**—CONVENIENCES.—Erection of sanitary conveniences in the Market-place, for the T.C. Mr. Percy A. Benn, City Surveyor, Guildhall, Lichfield. Deposit £2 2s.

OCTOBER 2.—**Llanelly.**—PAINTING.—For painting internal wood and ironwork at Llanelly Hospital. Mr. G. Williams, solicitor, Hospital Secretary, 22, Stepney-street, Llanelly.

OCTOBER 2.—**Normanton.**—PAINTING.—For painting Council offices, fire station, &c., for the U.D.C. Surveyor, Council Offices, Normanton.

OCTOBER 2.—**S.W. England.**—WORKS AND REPAIRS.—War Department contracts for works and repairs in the South-Western area from October 2, 1922. Separate tender for the various towns will be accepted. Royal Engineer Office, Mount Wise, Devonport.

OCTOBER 2.—**Warrington.**—PAINTING.—For internal painting of administrative block, Aikin-street Hospital, health office, dispensary, fire station, and the external painting of various properties, for the T.C. Mr. Andrew M. Ker, Borough Engineer, Warrington.

OCTOBER 3.—**Chelsea, S.W.**—DECORATIONS.—Internal painting, whitewashing and repairs to the staircases and corridors of the main block at the Infirmary, Cale-street, Chelsea, for the Guardians of the Poor of the Parish of Chelsea. Mr. Edmund J. Harrison, architect, 23, Berkeley-road, Crouch End, N.8. Deposit £2.

OCTOBER 3.—**Hemel Hempstead.**—COTTAGES.—Erection of 10 cottages, for the Borough Council. Mr. Walter R. Locke, Borough Engineer and Surveyor, Market-square, Hemel Hempstead. Deposit £1 1s.

OCTOBER 3.—**London.**—PAINTING.—For internal painting, &c., at the Admiralty, blocks 1–4, and old building. Contracts Branch, H.M. Office of Works, King Charles-street, London, S.W. 1. Deposit £1 1s.

OCTOBER 3.—**London, S.W. 18.**—PAINTING.—Painting, &c., at the intermediate Schools, Swaffield-road, Wandsworth, S.W. 18. Mr. F. J. Curtis, Clerk, Union Offices, St. John's-hill, Wandsworth, S.W. 18.

OCTOBER 3.—**Monmouthshire.**—REPAIRS AND BUILDING ALTERATIONS.—The Small Holdings Committee of the Monmouthshire Agricultural Committee invites tenders for repair, alteration, and adaptation of farm buildings in the county, and some minor repairs to cottages on the holdings, for Messrs. S. G. Lewis, and R. O. Peterson, at Pensarn, about 5½ miles from Newport and 2 miles from Cymbran. Mr. A. Every-Clayton, County Land Agent, 2, Gold Tops, Newport (Mon). Deposit £1 1s.

OCTOBER 3.—**Mynyddislwyn.**—RESTORATION OF CHURCH.—For restoration work at Mynyddislwyn Parish Church. Mr. C. Flower, Millbrook House, Pontllanfraith.

OCTOBER 3.—**Warrington.**—HUT.—Supply and erection complete of a recreation hut, 60 ft. by 20 ft., for the sanatorium, for the T.C. Mr. Andrew M. Ker, Borough Engineer, Warrington.

OCTOBER 3.—**West Norwood.**—ALTERATIONS.—For execution of alterations at the Children's Infirmary, for the Guardians of the Poor of the Parish of Lambeth. Mr. James L. Goldspink, Clerk, Brook-street, Kennington-road, S.E 11. Deposit £2.

OCTOBER 4.—**Birdwell.**—PAINTING.—For the painting and decorating of the Birdwell Working Men's Club, Birdwell, near Barnsley. Mr. J. Matthewman, Birdwell Working Men's Club, Birdwell, near Barnsley.

OCTOBER 4.—**Colchester.**—VARIOUS WORKS.—For artificers' works, repairs and materials, at the following places in the Eastern area of the Eastern Command:—(1) Colchester; (2) Landguard, including Harwich, Ipswich, etc.; (3) Norwich, including Great Yarmouth; (4) Bury St. Edmunds; (5) Brentwood Division. F. A. K. White, Commanding Royal Engineer, Eastern Area, Royal Engineer Office, Colchester.

OCTOBER 5.—**Doncaster.**—HOUSES.—Erection of 60 houses of the "A" class, in Theobald-avenue and Chequer-avenue, for the T.C. Mr. R. E. Ford, Housing urveyor, 3, Priory-place, Doncaster. Deposit £2 2s.

OCTOBER 5.—**Llangeinor.**—ROADS AND SEWERS CONSTRUCTION.—The Ogmore and Garw U.D.C. invite tenders for construction of roads and sewers in connection with the housing site at Llangeinor. The work will complete the laying-out for 46 houses in the course of erection. Mr. A. H. Jenkins, P.A.S.I., Housing and Town-Planning Surveyor, Council Offices, Brynmenin.

OCTOBER 5.—**Roehampton.**—HOUSES.—Erection on the Roehampton Estate, Putney, of 168 cottages, for the L.C.C. Architect to the Council, County Hall, Westminster Bridge, S.E. 1. Deposit £2.

OCTOBER 7.—**Consett.**—PAINTING.—For painting and decorating the Primitive Methodist Church, Watling-street, Leadgate. Mr. Wm. Crowther, 43, The Bungalows, Villa Real, Consett.

OCTOBER 7.—**Llangaddock.**—BUILDING AND ALTERATIONS.—The Carmarthenshire County Small Holdings Committee invite tenders for erecting a dwelling-house and for adapting and altering farm buildings at Ynysymoch Danyrallt, Llangaddock. Mr. W. Vincent Morgan, A.R.I.B.A., County Architect, County Council Offices, Carmarthen.

OCTOBER 7.—**Oakham.**—LAUNDRY, ETC.—Erection of new laundry and alterations to buildings, for the Board of Guardians. Mr. F. W. Nichols, Market-place, Oakham. Deposit £1 1s.

OCTOBER 7.—**Preston.**—ADDITIONS.—For additions and alterations at the Park School, Moor Park, for the T.C. Borough Surveyor, Town Hall, Preston.

OCTOBER 8.—**St. David's.**—TOWN HALL, &c.—Erection of town hall, library, &c. Mr. W. D. Williams, St. David's, Pembroke.

*OCTOBER 9.—**London, W.**—WORK, SUPPLY OF MATERIALS.—Work, supply of materials, &c. (various), for the six months from October 1, 1922, to March 31, 1923, for the Royal Borough of Kensington Council. Mr. Wm. Chambers Leete, Town Clerk, Town Hall, Kensington, W.8.

OCTOBER 9.—**Nottingham.**—HOME, &c.—Erection of a new receiving home and alterations to the infants' home, Hartley-road, for the B.G. Messrs. Ernest R. Sutton & Son, F.R.I.B.A., Albion Chambers, King-street, Nottingham. Deposit £2 2s.

OCTOBER 9.—**Preston.**—BRIDGE.—Erection of retaining walls, abutments, &c., at Oxheys Bridge, over the L. & N.W. Railway, for the T.C. Borough Surveyor, Town Hall, Preston. Deposit £1 1s.

OCTOBER 10.—**France and Belgium.**—HEADSTONES.—Headstones for the British Military Cemeteries in France and Belgium. Secretary, Works Department, Imperial War Graves Commission, 82, Baker-street, London, W. 1.

OCTOBER 10.—**Hereford.**—SORTING OFFICE.—Erection of a station sorting office, for the Commissioners of H.M. Works, &c. Contracts Branch, King Charles-street, London, S.W. 1. Deposit £1 1s.

OCTOBER 11.—**Bolton-on-Dearne.**—CONVENIENCES.—Erection of additional conveniences at Bolton-on-Dearne Highgate Council School, for the West Riding E.C. Education Department, County Hall, Wakefield.

OCTOBER 11.—**Leytonstone, E.11.**—DEPOT, &c.—For the construction of motor dust van charging depot and cart and roller sheds at the Electricity Station, Cathall-road, for Leyton U.D.C. Mr. Ernest H. Easex, A.M.I.C.E., Town Hall, Leyton. Deposit £2 2s.

*OCTOBER 12.—**London, N.**—REINFORCED CONCRETE WORK.—Construction of a reinforced concrete diving stage to be erected at Highgate Bathing Pond, Parliament Hill Fields, for the L.C.C. Chief Officer, Parks Department (Room 395c), County Hall, Westminster Bridge-road, S.W.1.

*OCTOBER 13.—**Hammersmith, W.**—REPAIRS.—Carrying out of repairs to the properties included under the Housing Schemes for a period of six months. Borough Engineer and Surveyor, Mr. R Hampton Clucas, M.I.C.E, Town Hall, Hammersmith, W.6.

OCTOBER 14.—**Colwyn Bay.**—NEW BLOCK, &c.—Erection of new Nursing Block (47 beds) and additions and alterations to the existing hospital in Hesketh-road, for the Building Committee of Colwyn Bay and West Denbighshire Hospital. Mr. S. Colwyn Foulkes, A.R.I.B.A., Architect, Central Chambers, Colwyn Bay. Deposit £3 3s.

BUILDING TRADE WAGES IN SCOTLAND.*

THE following are the present rates of wages in the building trade in the principal towns of Scotland. Every endeavour is made to ensure accuracy, but we cannot be responsible for errors that may occur:—

	Masons.	Bricklayers.	Carpenters, Joiners.	Plasterers.	Slaters.	Plumbers.	Painters.	Masons' Labourers.	Bricklayers' Labourers.	Plasterers' Labourers.
Aberdeen	1/7	1/10½	1/7	1/7½	1/8	1/9	1/7	1/2 to 1/4		
Airdrie	1/8	1/8	1/8	1/8	1/8	1/8	—	1/-		
Alexandria	1/8	1/8	1/8	1/8	1/8	1/8	—	1/2		
Arbroath	1/7	1/7	1/7	1/7	1/7	1/7	1/8	1/1		
Ayr	1/8	1/8	1/8	1/8	1/8	1/8	1/9	1/3		
Bathgate	1/8	1/8	1/8	1/8	1/8	1/8	1/9	1/2		
Blairgowrie	1/7	—	1/7	1/7	1/7	1/7	1/7	—		
Bo'ness	1/8	1/8	1/8	1/8	1/8	1/8	1/9	1/2		
Coatbridge	1/8	1/8	1/8	1/8	1/8	1/8	1/9	1/3		
Dumbarton	1/8	1/8	1/8	1/8	1/8	1/8	1/9	1/3		
Dumfries	1/6	1/6	1/6	1/6	1/6	1/8	1/8	1/3	1/2½	1/3½
Dundee	1/8	1/8	1/8	1/8	1/8	1/8	1/9	1/-		
Dunfermline	1/8	1/8	1/8	1/8	1/8	1/8	1/9	1/3		
Edinburgh	1/8	1/8	1/8	1/8	1/8	1/8	1/9	1/3		
Falkirk	1/8	1/8	1/8	1/8	1/8	1/8	1/9	1/3		
Fort William	1/6	1/6	1/6	1/6	1/6	1/6	—	1/1½		
Galashiels	1/6	1/6	1/6	1/6	1/6	1/6	1/8	1/1½		
Glasgow	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/3		
Greenock	1/8	1/8	1/8	1/8	1/8	1/8	1/9	1/1 to 1/3		
Hamilton	1/8	1/8	1/8	1/8	1/8	1/8	1/9	1/3		
Hawick	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/3		
Helensburgh	1/8	1/8	1/8	1/8	1/8	1/8	1/9	1/3		
Inverness	1/6½	—	1/6	1/7	1/6½	1/7	1/8	1/0 to 1/2		
Kilmarnock	1/8	1/8	1/8	1/8	1/8	1/8	1/9	1/3		
Kirkcaldy	1/8	1/8	1/8	1/8	1/8	1/8	1/9	1/2		
Kirkwall	1/5	1/5	1/4	1/7	1/5	1/5	1/4	1/2		
Lanark	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/3		
Leith	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/2		
Motherwell	1/8	1/8	1/8	1/8	1/8	1/8	—	1/3		
Perth	1/8	1/8	1/8	1/8	1/8	1/8	1/7	1/2		
Stirling	1/8	1/8	1/8	1/8	1/8	1/8	1/9	1/3		
Stirlingshire (Eastern District)	1/8	1/8	1/8	1/8	1/8	1/8	1/9	1/3		
Wishaw	1/8	1/8	1/8	1/10	1/8	1/8	1/9	1/3		

* The information given in this table is copyright. The rates of wages in the various towns in England and Wales are given on page 469.

OCTOBER 16.—**Birkenhead.**—STORES, &c.—(*a*) Provision of food, coal, and firewood stores; and (*b*) alterations and additions to the maternity block at Infirmary, for the B.G. Mr. A. E. Shennan, architect, Guardian Assurance Buildings, 37, Dale-street, Liverpool.

✱OCTOBER 16.—**Hendon.**—PUBLIC CONVENIENCE.—Construction of public convenience (underground) at Brent-street, Hendon, for the U.D.C. Mr. A. O. Knight, A.M.I.C.E., Engineer to the Council, Town Hall, Hendon, N.W. 4. Deposit £2 2s.

OCTOBER 17.—**Walsall.**—HOUSES.—Erection of 20 houses in two blocks of ten in Lord-street; 19 houses in three blocks of six and seven in Green-lane, for the T.C. Mr. John Taylor, Council House, Walsall. Deposit £1.

NO DATE.—**Dorchester.**—BUILDING WORKS.—(1) Drone's-lane Farm, Twyford.—Glyn Estate: Repairs to cottage and new set of farm buildings. (2) Kinson Farm Colony, Kinson.—New roofs to No. 10 Holdings, converted Army huts. (3) Shillingstone.—Repairs and additions to "New Barn," Eastbrook Farm. (4) Oborne.—No. 2, New Cottages; No. 7, sets of farm buildings. Director of Agriculture, County Offices, Dorchester.

NO DATE.—**Kirklinton.**—FARM BUILDINGS.—Erection of farm buildings at Dubwarth, Kirklinton. Mr. Edward S. Simpson, Kirklinton, Carlisle.

NO DATE.—**Newcastle-on-Tyne.**—CHURCH.—Erection of proposed Church buildings in Osborne-road, for the Christian Scientists. Messrs. Davidson & Sons, architects, 14, Rectory Drive, Gosforth, Newcastle-on-Tyne.

FURNITURE, MATERIALS, etc.

SEPTEMBER 30. — **Gellygaer.** — MATERIALS. — Supply of paving, kerb and channel drain pipes, cement and lime, cast iron goods, smith-work, etc., to Gellygaer U.D.C. Mr. John Evans, Clerk, Council Offices, Hengoed.

SEPTEMBER 30.—**Haverfordwest.**—TOOLS.—For supply during twelve months ending September 30, 1923, of workmen's tools for Haverfordwest R.D.C. Mr. J. A. Rice, Highway Surveyor, Letterston (Pemb.).

SEPTEMBER 30.—**Mansfield.**—EQUIPMENT.—For furnishing and equipping the Ransom Sanatorium (80 beds), Mansfield, for Nottinghamshire County Council. County Medical Officer, Shire Hall, Nottingham.

SEPTEMBER 30.—**Stoke-on-Trent.**—LIME.—Supply of best lump lime to the T.C. Borough Sewage Engineer, Leek-road, Stoke-on-Trent.

OCTOBER 2.—**Maldon.**—ROAD MATERIALS.—Supply to the R.D.C. of broken granite, Kentish flints, gravel. Mr. E. J. Ennals, surveyor, 6, Market-hill, Maldon.

OCTOBER 2.—**Sunbury-on-Thames.**—GRANITE.—Supply of about 150 tons of Guernsey, Enderby, Clee Hill, Bardon Hill, or Charnwood granite, to the U.D.C. Mr. Harold F. Coales, Surveyor, Council Offices, Sunbury-on-Thames.

OCTOBER 3.—**Warrington.**—SANITARY GOODS, &c.—For sanitary goods and glazed verandah for new conveniences, for the T.C. Mr. Andrew M. Ker, Borough Engineer, Warrington.

OCTOBER 6.—**Birkenhead.**—STORES.—Supply of various stores to the Mersey Railway Co. Mr. J. Shaw, General Manager, Central Station, Birkenhead.

OCTOBER 6.—**London.**—CASEMENTS, &c.—Supply to H.M. Commissioners of Works of steel casements, sashes, &c., at the New Science Museum, South Kensington. Contracts Branch, H.M. Office of Works, King Charles-street, London, S.W. 1.

OCTOBER 6.—**London.**—MATERIALS.—Supply to the High Commissioner for India of:—(1) shovels; (2) cocks, bib and stop, galvanised; (3) point rodding, 1¼ in. Director-General, India Store Department, Belvedere-road, Lambeth, S.E.1.

OCTOBER 7.—**Bedlingtonshire.**—ROAD MATERIAL.—Supply of Whinstone and tarred slag, to the U.D.C. Mr. J. W. Pooley, surveyor, Bedlington.

OCTOBER 9.—**Kensington.**—MATERIALS.—Supply to the B.C. of road materials, iron goods, &c. Mr. W. Chambers Leete, Town Clerk, Town Hall, Kensington, W.

OCTOBER 10.—**Egypt.**—STORES.—Supply of stores, including hardware, oils and paints, etc., to the Frontier Districts Administration, Alexandria. Department of Overseas Trade, 35, Old Queen-street, S.W.

OCTOBER 15.—**London.**—CEMENT.—Supply to the High Commissioner for India of Portland cement in casks of 400 lb. each (7,500 casks). Director-General, India Store Department, Branch No. 12, Belvedere-road, Lambeth, S.E.1.

ENGINEERING, IRON AND STEEL.

SEPTEMBER 30.—**Stoke-on-Trent.**—FENCING. — For 400 yds. of iron fencing at the Hanley Sewage Works, for the T.C. H. Makepeace, Borough Sewage Engineer, Stoke-on-Trent.

OCTOBER 2.—**Croydon.**—LAUNDRY PLANT.—Supply to the B.G. of laundry machinery. Mr. Norman P. Walker, Clerk, Union Offices, Mayday-road, Thornton Heath.

OCTOBER 2.—**London.**—TYRES.—Supply to the Bengal-Nagpur Railway Co., of 700 steel tyres. Company's Offices, 1-2, Gresham House, Old Broad-street, London, E.C.2. Charge £1 1s.

OCTOBER 2.—**Mid-Glamorganshire.**— MAINS.—For laying 107 lin. yds. of 4 in. and 442 lin. yds. of 3 in. diameter cast iron mains with all necessary sluice valves, hydrants, etc., at Bridgend housing site, for the Mid-Glamorgan Water Board. Mr. E. W. Davies, Superintendent and Manager, Water Board Offices, Bridgend. Deposit £1 1s.

OCTOBER 3.—**Barton-upon-Irwell.**—LIFT.—Provision and erection of an electric lift at the Union Infirmary, Green-lane, Patricroft. Mr. P. Howard, A.R.I.B.A., 88, Mosley-street, Manchester. Deposit £2 2s.

OCTOBER 3.—**Chorley.**—ROLLER.—Supply of one 10-ton (Standard) compound steam roller to the R.D.C. Mr. W. Cotterill, Surveyor, High-street, Chorley.

OCTOBER 3.—**Lochmaben.**—HEATING INSTALLATION. —For central heating installation at Sanatorium about to be erected near Lochmaben. Mr. Evan Tweedie, architect, 43, Lady-street, Annan.

OCTOBER 4.—**London.**—RAILWAY MATERIALS.—Supply to the South Indian Railway Company of (1) 704 axle-boxes for wagons; (2) 36,000 fog signals; (3) rivets, nuts and pins. Mr. A. Muirhead, Managing Director, 91, Petty France, S.W. 1. Charge, 10s. per specification.

OCTOBER 4.—**London.**—RAILWAY MATERIAL.—Supply to the South Indian Railway Co. of (1) 46 metre gauge locomotives and six locomotive boilers; (2) 108 metre gauge wagons; (3) bridgework. Company's Offices, 91, Petty France, Westminster, S.W. 1. Charges, £2 for (1), and £1 for (2) and (3).

OCTOBER 6.—**London.**—RAILWAY MATERIALS.—Supply to the Bombay-Baroda and Central India Railway Co. of (1) steel materials, (2) wheels and axles. Mr. S. G. S. Young, Secretary, The White Mansion, 91, Petty France, Westminster, S.W.1. Charge 10s.

OCTOBER 9.—**Preston.**—BRIDGE.—Supply and erection of steelwork at Oxheys Bridge, over the L. & N.W. Railway, for the T.C. Borough Surveyor, Town Hall, Preston. Deposit £1 1s.

OCTOBER 10.—**Liverpool.**—BOILER.—For one Cornish boiler, 19 ft. by 6 ft., to be installed at Lodge-lane Baths and Washhouse, for the T.C. Chief Superintendent, Baths Department, 75, Dale-street, Liverpool. Deposit 10s.

OCTOBER 10.—**London.**—RAILWAY MATERIALS.—Supply to the South Indian Railway Co. of (1) brushes, (2) laminated helical, and volute springs, (3) foundry coke, (4) carriage fittings. Offices, 91, Petty France, Westminster, S.W.1. Charge 10s.

OCTOBER 12.—**Runcorn.**—PUMP.—Supply and fixing of a 10,000 gallons per hour motor-driven pump and foundations for same, &c., at the waterworks pumping station, Ship-street, Frodsham, for the R.D.C. Messrs. E. Timmins & Sons, Ltd., Bridgewater Foundry, Runcorn. Deposit £1 1s.

OCTOBER 17.—**Edinburgh.**—TRAMWAY MATERIALS.—Supply of trucks, electrical equipment of cars, wheels, and axles, and steel tramway poles. Tramways Manager, 2, St. James-square, Edinburgh.

OCTOBER 21.—**Birmingham.**—DESTRUCTOR.—Supply and erection of a new destructor unit at the Montague-street Destructor Works, for the T.C. Mr. James Jackson, Superintendent, Salvage Department, Council House, Birmingham. Deposit £1 1s.

OCTOBER 26. — **London.**—MATERIALS.—Supply of brass sheets and rods and ebonite sheets and rods, for the Government of Australia. Supply Officer, Room 101, Australia House, W.C.

OCTOBER 28. — **Newcastle-on-Tyne.** — DREDGING PLANT.—Supply to the Tyne Improvement Commission of dredging plant. Mr. J. McDonald Manson, General Manager, Tyne Improvement Commission Offices, Bewick-street, Newcastle-upon-Tyne. Deposit £5.

NOVEMBER 28.—**New Zealand.**—CRANE.—Suppy to the Auckland Harbour Board, New Zealand, of one 1-ton fixed pedestal crane for King's Wharf. Messrs. W. and A. McArthur, Ltd., 18-19, Silk-street, Cripplegate, E.C.2. Deposit £1 1s.

DECEMBER 18.—**Victoria.**—COAL HANDLING PLANT. —For coal handling plant for the Morwell Power scheme, for the Victorian State Electricity Commission. Agent-General for Victoria, Melbourne-place, Strand, W.C.2. Deposit £2 2s.

FEBRUARY 1, 1923.—**Auckland.**— ELECTRIC CRANES —For the supply of twelve five-ton (alternatively three-ton) semi-portal balanced jib electric quay cranes, four five-ton (alternatively three-ton) balanced jib electric roof cranes, and six one-ton electric monorail cranes, for Auckland Harbour Board. Messrs. W. & A. McArthur, Ltd., 18-19, Silk-street, Cripplegate, London, E.C. 2. Deposit £2 2s.

ROAD, SANITARY, AND WATER WORKS.

SEPTEMBER 30.—**Rotherham.**—SEWERAGE.—For the construction of (1) Sewage disposal works (tanks and filters) and 9 in. stoneware pipe sewer in the Parish of Wickersley; (2) sewage disposal works (tanks and filters) and 9 in. stoneware pipe sewer in the parish of Dalton, for the R.D.C. Mr. C. O. Rawstron, Surveyor, Imperial Buildings, Rotherham. Deposit £3 3s.

OCTOBER 2.—**Ashington.**—WATER MAIN.—Laying of about 2½ miles of 4 in. water pipe from Linton Colliery to Ellington and Lynemouth. Mr. Joseph J. Hall, Agent, Ashington Coal Co., Ltd., Ashington.

OCTOBER 2.—**Hayes.**—ROADS.—For the widening of Coldharbour-lane and construction of sewer, &c., for the U.D.C. Mr. D. C. Fidler, surveyor, Hayes. Deposit £2 2s.

OCTOBER 3.—**Sowerby Bridge.**—ROADS.—For widening Pye West-road, for the U.D.C. Mr. J. Eastwood, Surveyor, Council Offices, Sowerby Bridge.

OCTOBER 3.—**Thornhill.**—ROADS.—Construction of roads and footpaths and incidental work at Kelloholm site, Kirkconnel, for the District Committee. Mr. William Scott, architect, Inglewood, Sanquhar. Deposit £1 1s.

OCTOBER 4.—**Barnsley.**—ROADS.—For the making and completing of five back roads, separate contracts, within the borough. Mr. H. Taylor, Borough Surveyor, Fairfield House, Barnsley.

OCTOBER 4.—**Glasshoughton.**—PAVING.—For paving works at Glasshoughton, in the Rural District of Pontefract, for the West Riding C.C. Mr. H. R. Hepworth, West Riding Surveyor, County Hall, Wakefield. Deposit £1.

OCTOBER 4.—**Yeovil.**—WATER WORKS. — Laying 6,000 yds. of 12-in. cast-iron mains, valves, hydrants, &c., for the T.C. Mr. Alfred J. Price, Borough Surveyor, Municipal Offices, Yeovil.

OCTOBER 5.—**Ogmore.**—ROADS, &C.—Construction of roads and sewers necessary to complete the layout for 46 houses, for the U.D.C. Mr. A. H. Jenkins, Housing and Town Planning Surveyor, Council Offices, Brynmenyn.

OCTOBER 7.—**Norton.**—WATER MAIN.—Laying of about 1,800 yards of 2 in. steel water main at Yedingham, for the R.D.C. Mr. J. L. Chapman, Clerk, Town Hall, Malton.

OCTOBER 9.—**Camberwell.**—ASPHALTING.—Providing and laying of mastic asphalte in various roads, for the B.C. Mr. Frederick J. Slater, Borough Engineer, Town Hall, Camberwell, S.E.5.

OCTOBER 11.—**Aberdeen.**—WATER WORKS.—Laying and jointing of 2 miles of 48 in. mild steel piping and ancillary works, for the T.C. Mr. George Mitchell, Water Engineer, 41½, Union-street, Aberdeen.

OCTOBER 11.—**Crewe.**—SEWERAGE WORKS.—Construction of storm water tank, 120 ft. by 60 ft., and percolating filter, 100 ft. diameter, for the T.C. Mr. L. St. G. Wilkinson, Borough Engineer, Municipal Buildings, Crewe. Deposit £2 2s.

OCTOBER 11.—**Sherburn-in-Elmet.**—WATER SUPPLY. —Laying-on of water supply and conversion of offices at Sherburn-in-Elmet Council School, for the West Riding E.C. Education Department, County Hall, Wakefield.

OCTOBER 14.—**Margate.**—WATERWORKS.—For sinking of shafts and extending adits of about 1,000 yards in connection with the Corporation water supply at Wingham. Mr. E. A. Borg, 13, Grosvenor-place, Westminster, S.W.

OCTOBER 21.—**Newport (Mon).**—WATERWORKS.—Laying and jointing of about 28 miles of cast-iron pipes, construction of a service reservoir, bridges, valve houses, and other works, for the T.C. Messrs. G. H. Hill & Sons (Westminster), 3, Victoria-street, Westminster. Deposit £5.

NO DATE.—**Burnley.**—ROADS.—Construction of roads and sewers in connection with the Palace House Housing Scheme, for the T.C. Mr. G. H. Pickles, Borough Engineer, Town Hall, Burnley.

NO DATE.—**Leeds.**—BOWLING GREEN, &C.—Laying cricket pitch and bowling green. Secretary, *Yorkshire Post* and *Evening Post* Sports Club, Albion-street, Leeds

Competitions.

(*See Competition News, page* 442.)

Auction Sales, Tenders, etc.

OCTOBER 2, 3, AND 4.—**Newbury.**—Messrs. F. H. & C. E. Clark will sell, without reserve, the whole of the materials contained in Newbury Depot. Auctioneers, Beddington House, Beddington, Croydon.

OCTOBER 3, 4 AND 5.—**W. Norwood, S.E.**—Messrs. Veryard & Yates, F.A.I., will sell at Dunbar Works, Government stores, &c. Auctioneers, 365, Norwood-road, S.E.27.

OCTOBER 4 AND 5.—**Henley-on-Thames.**—Messrs. Joseph Hibbard & Sons will sell without reserve, by order of A. West, Esq., to clear site at Henley-on-Thames (adjoining railway station yard and Reading-road), stock and plant of English timber and sawmills, including machinery, railway track, lorries and cart horses, office furniture, &c. Auctioneers, 15, Newington Green, Islington, London, N.16.

✱OCTOBER 10.—**Chatham.**—Messrs. Joseph Hibbard & Sons will sell (without reserve), by order of Messrs. Fenner, Brewer & Co. Ltd., owing to expiration of lease, stock and plant of timber merchants and saw mill proprietors, building material, ironmongery, machinery, Daimler lorry and Rover 2-seater motor-car. Auctioneers, 15, Newington Green, Islington, London, N.16.

OCTOBER 10.—**Kent.**—Messrs. John D. Wood & Co. will sell (unless previously disposed of) at the London Auction Mart, 155, Queen Victoria-street, E.C., by order of the mortgagees in possession, the freehold property known as the Orpington Golf Course, extending to about 66½ acres, with modern club house. Auctioneers, 6, Mount-street, London, W.1.

OCTOBER 10. — **London, E.C.** — Messrs. Fuller Horsey, Sons & Cassell will sell, by order of the Port of London Authority, at the Merchants' Hall, Baltic Exchange, St. Mary Axe, builders and contractors' plant, &c. Auctioneers, 11, Billiter-square, E.C.3.

✱OCTOBER 10, 11 AND 12.—**Amesbury.**—Messrs. Callaway & Co. will sell, by direction of the Disposal Board, the whole of the hutments contained in Camps Nos. 3a and 25, and parts of Camps Nos. 10, 17, 21, 28, 29, and the Fargo Destructor at Larkhill. Auctioneers, 6, Queen-street, Exeter.

✱OCTOBER 12 & 13.—**Queensferry, Cheshire.**—Messrs. Hy. Butcher & Co. will sell, without reserve, Government Surplus Stores at Central Stores, Depot No. 473, at 11 a.m. Auctioneers, 63 and 64, Chancery-lane, London, W.C. 2.

Public Appointments.

✱OCTOBER 4. — **Bridgwater.** — Assistant to the Borough Surveyor for the T.C. Borough Surveyor, Municipal Buildings, Bridgwater.

✱OCTOBER 14.—**Yorkshire.**—BUILDING INSPECTOR. —Building Inspector wanted for large Public body in Yorkshire. Leeds Advertising Agency, City-square, Leeds.

OCTOBER.—**India.**—Assistant Inspector of stores required by the High Commissioner for India. Director-General, India Store Department, Belvedere-road, Lambeth, S.E.1. (Quote Ref. S.5967/1922.)

House-Building at Featherstone.

The tender of Messrs. G. Chapman, Ltd., Oakwood-parade, Roundhay, Leeds, for the erection of 12 houses on the Church Fields site, Purton, for the Featherstone U.D.C., has been accepted.

PROPOSED NEW BUILDINGS & OTHER WORKS.*

In these lists care is taken to ensure the accuracy of the information given, but it may occasionally happen that, owing to building owners taking the responsibility of commencing work before plans are finally approved by the local authorities, "proposed" works at the time of publication have been actually commenced. Abbreviations:—T.C. for Town Council; U.D.C. for Urban District Council; R.D.C for Rural District Council: E.C. for Education Committee; B.G. for Board of Guardians; L.C.C. for London County Council; B.C. for Borough Council; and P.C. for Parish Council.

ABERYSTWYTH.—Plans have been passed for a new hotel on the site of the Waterloo Hotel, which was destroyed by fire.

AIRDRIE.—Plans passed by Dean of Guild Court: Two houses, for Mr. Paterson, builder.

ALLOA.—Plan passed by Dean of Guild Court: House, Tower-street, submitted by Messrs. Melvin & Sons, architects.

ALTON.—The B.G. proposes to carry out alterations at the Institution at an estimated cost of £6,500.

BANGOR.—Mr. W. M. Cross, an inspector of the Ministry of Health, has held an inquiry concerning an application by the T.C. for the approval of the Ministry of the purchase of a quantity of land at Glanadda for the purposes of a cemetery.

BARMOUTH.—Mr. W. M. Cross, Inspector of the Ministry of Health, has held an inquiry into the application by the U.D.C. for sanction to borrow £8,000 for extending the waterworks.

BARNSLEY.—Mr. A. V. Eyre is opening out a new estate at Secker-lane, Woolley, and plans have been provided by the R.D.C. for sewers and outfall works, and two detached houses. The Council has also approved plans of two bungalows on the same estate for Mr. T. Bower and of a residence and garage in Secker-lane for Major H. H. T. Burbury.

BRAMPTON.—Plans passed by U.D.C.: Bungalow, near How Mill, Mr. Foxall, architect, Carlisle, for Mr. T. O'Neil, South Shields; renovations to cottages, Moatside, for Mr. H. Penfold.

BURY ST. EDMUND'S.—Plans have been passed for the conversion of 8, Cornhill, into two lock-up shops, for Smith & Sons, Ltd., new sanitary conveniences at St. Peter's School, and alterations to the Theatre Royal.

CAERPHILLY.—£5,000 is to be raised at Caerphilly for the erection of a war memorial library and institute Initial contributions have been received.

CHESTER.—Plans passed: Shop front, 17, Eastgate-street, for Montague Burton, Ltd.; shop front, 22, Foregate-street, for Muirhead & Willcock; shop front, 31, Northgate-street, for Jones, Smith & Son; alterations, "Fairholme," Woodlands-road; alterations, 8, Curzon-park, for Mr. A. S. Dutton; alterations, 29, Eastgate-street, for J. Jones, Ltd.; house, Lache-lane, for Mr. J. C. Walker; alterations, 105 & 107, Garden-lane, for Mr. F. Price; workshop, Trinity-street, for Messrs. F. J. Jones & Co.; house, Stock's-lane, for Mr. E. Watkinson; alterations, 8, Northgate-street, for Richard Jones & Co., Ltd.

CONSETT.—Plans passed by U.D.C.: Addition to warehouse, Teasdale-street, for Mr. J. Atkinson; bakery, Nile-street, for Miss Cowey; bungalows, Knitsley-lane, for Mr. W. Stephenson.

DARLINGTON.—It was reported at a meeting of the Streets Committee that plans were ready for the opening up of Woodside estate, in the west end of the town, for building purposes. The plans provide for the erection of a number of semi-detached villas and their approval was deferred until the Borough Surveyor had had an opportunity of going into the question of the drainage. Meanwhile, the Corporation have in hand a scheme for the erection of a large number of houses in the Cockerton district. In this district also the North-Eastern Railway Company are building several hundred houses, also in the Cockerton area, with the object of housing the large number of workmen who will be required for the new wagon works now in course of erection there.

DESBOROUGH.—Plans passed by U.D.C.: Bungalow for Mr. F. Turner; workshop, for Messrs. Bryan & White.

DURHAM.—Plans passed by R.D.C.: Alterations and additions to Quarrington-hill Wesleyan Chapel; motor garage for Neville's Cross Laundry; warehouse and garage for Mr. Shields at Coxhoe.

EASINGTON.—At a meeting of R.D.C. the Building Committee reported having approved plans for 253 houses at Horden Colliery for the Horden Collieries, Ltd.

EASTBOURNE.—Plans passed by R.D.C.: Bungalow, at Birling Gap, for Mr. A. Wigglesworth, per Mr. S. G. Scales, architect; house at Little-lane, East Dean, for Mrs. Catling, per Mr. S. B. Russell; bungalow on a part of Dittons Farm, Westham, for Mr. A. G. Hirst, per Mr. G. A. Hill; bungalow at Hankham, for Mr. H. R. Goode; addition to a building at Fence Bridge, Pevensey, for Mr. E. Akehurst; bungalow at Willingdon, for Mr. H. Putland, per Mr. A. E. Bailey; house at Little Hill, East Dean, for Mrs. MacAskew, per Mr. F. G. Cooke.

EDINBURGH.—The T.C. has agreed to the proposals for carrying out improvement schemes in the Cowgate and Grassmarket areas.

FALKIRK.—The Dean of Guild Court has granted a warrant to Mrs. Harriet Gardner to erect a bungalow on vacant ground at the corner of Major's Loan and Hodge-street, at an estimated cost of £1,200. Plans were submitted on behalf of Shell-Mex, Ltd., 5, Lynedoch-place, Charing Cross, Glasgow, for the erection of premises on ground situated at the corner of Smith-street and Maxwell-place, to be used for storing non-inflammable lubricating oil. The estimated cost of the erection was given at £1,900. The plans were passed.

FYLDE.—Plans passed by R.D.C.: A Taylor, bungalow, Fleetwood-road; E. Frost, bungalow, Blackpool-road; E. A. Clitheroe, bungalow, Bispham-road; and the Carleton Building Co., bungalow, Robins-lane, all in Carleton.

GELLYGAER.—The County School Governors are in communication with the County Council in respect to much needed extensions and alterations at Pengam Boys' School.—The U.D.C. has called for estimates for a new steam or petrol fire-engine.

HARPENDEN.—Plans passed by U.D.C.: Houses, Wordsworth-road, for Mr. L. A. Johnson and Mrs. C. R. Jervois; Devonshire-road, Mr. A. E. Button and Mr. F. Ebbs; Ox-lane, Dr. Harford; Sauncey-avenue, Harpenden Building Co.; bungalow, Milton-road, Mr. J. Kitchener; cloister and chapel extension, St. George's School, Co-Educational Public Schools Trust; mission hall, Luton-road, Congregational Church trustees; addition, Manland Cottage, Station-road, Mr. H. Raban; office, Midland Station approach, Gray, Phillips & Co.; motor houses, "Trengrove," Rothamsted-avenue, Mr. H. E. Broad; "Nunclose," Milton-road, Mr. A. Puddephat; Cowper-road, Mr. W. Claridge; and Rothamsted-avenue, Mr. F. W. Darby.

HAVERFORDWEST.—The R.D.C. has decided to renew application for grant to carry out widening of Tiers Cross and Johnstone roads.

HINCKLEY.—Plans passed by U.D.C.: Bungalow, Springfield-road, for Mr. S. Tompkin; printing works, Station-road, for Mr. S. Walker; bathroom, Queen's-road, for Mr. W. Iliffe; house, Highfields-road, for Mr. A. Jeffcote; garage off Rugby-road, for Mr. T. Cuer; factory, Hollier's-walks, for Mr. B. A. Ryley; cloakroom at the Church Hut, off Station-road; store shed and stable, Hollier's-walks, for Mr. B. A. Ryley.

HOVE.—Plans passed by T.C.: Messrs. Gates & Sons, for Messrs. Stringer, Ltd., alterations, 101, George-street; Messrs. J. Barnes & Sons, iron emergency staircase, 2, Cromwell-road; Mr. W. H. Overton, for Mrs. L. Drabble, conversion into flats, 3, Adelaide-crescent; Mr. W. H. Overton, for Mr. E. L. Gandar-Dower, conversion into flats, 37, Brunswick-terrace; Messrs. Plenty & Farrar, for Mrs. Somerville, proposed alterations, 9, Adelaide-crescent; Mr. B. James, for Mrs. Willis, proposed alterations, 1 and 2, The Lawns, Kingsway; Mr. A. W. Scammell, for Mr. T. A. Divall, house, Hove-street (east side); Messrs. Clayton & Black, for Mr. W. Armstrong, extension, 139, Church-road; Mr. W. Whiteman, for Mr. T. Pritchard, bungalow, Portland Villas (west side); Mr. J. Still, addition, 25, Portland Villas; Mr. W. H. Overton, for Mr. W. J. Keene, three pairs semi-detached houses, Langdale-road (west side); Mr. B. James, for Mr. A. Chadwell, pair semi-detached houses, Hove-street; Mr. F. G. Ridout, alterations, 6, Brunswick-street East; Messrs. Gates & Sons, for Mr. J. Macfarlane, conversion into flats, 16, St. Aubyns; Mr. P. B. Hunter, for Mr. S. Parkin, extension, 1, Namrick-mews.

KIDDERMINSTER.—Plans passed by T.C.: Factory extension in the New-road, for the Carpet Manufacturing Co., Ltd., and also in Hill-street; shop alterations in High-street, for the International Tea Co.; bungalow in the Birmingham-road, for Mr. F. R. Rowlands; garage in the Chester-road, for Mr. G. J. Shepherd; additions to shop, New-road, for Messrs. Charles Watkins & Son; office extension, Vicar-street, for Mr. G. A. Weston; office, Green-street, for Messrs. Boucher & Co.; and false flooring for factory extension in Green-street, for Mr. F. Stone.—Plans passed by T.C.: Factory extension in New-road and in Hill-street, for the Carpet Manufacturing Co., Ltd.; shop alterations in High-street for the International Tea Co.; bungalow, in Birmingham-road, for Mr. F. R. Rowlands; garage in Chester-road, for Mr. G. J. Shepherd; additions to a shop in New-road, for C. Watkins & Son; office extension in Vicar-street, for Mr. G. A. Weston; office in Green-street, for Boucher & Co.; flooring for factory extension in Green-street, for Mr. F. Stone.

LLANELLY.—The B.C. has passed a plan for new vicarage for Christ Church, near to yard of Messrs. B. Howell & Co. The estimates for half year commencing October 1, include sums, respectively, of £1,600, £250 and £1,000 for road resurfacing, work to Town Hall front, and work to market. The Council is applying for sanction for road and sewer works at Llanerch housing site. In connection with the Gwendraeth water supply scheme the Council has adopted recommendation of surveyor that land acquisitions necessary be at once made. The plan submitted, for extending Marged-street and erecting further houses, by Mr. C. R. Mansel Lewis has been referred to the surveyor. The surveyor was instructed to prepare plans and estimates for extensive private street works to be carried out.—It is ascertained that between £20,000 and £22,000 will be required to carry out the extensions that are to be made to the Llanelly General Hospital. Approximately £13,000 is in hand or assured to the fund.—The Borough Surveyor has reported that the Ministry of Transport has agreed to the arching of the River Lliedi during the winter. He estimated the cost at £135,000. The Roads Committee has given notice that the houses and buildings now over the river shall be removed.

LONDON (BERMONDSEY).—Plans passed by B.C.: Drainage, 239, Southwark Park-road, Messrs. Courtney & Fairbairn, for the London City & Midland Bank; drainage to receiving wards, &c., at Bermondsey Infirmary, Lower-road, Rotherhithe, Messrs. Newman & Newman, for the Board of Guardians; drainage, North Yard-buildings, Keeton's road, for Messrs. Peek, Frean & Co., Ltd.; drainage, 152, Bermondsey-street, Messrs. Friggens Bros., for Messrs. Heald Bros.; sanitary improvements, St. Arnold's-place, Mr. W. Figg, for Messrs. H. Franklin & Co.; sanitary improvements, 19, Tyers-gateway, Messrs. G. Potton & Son, for Messrs. E. Stern & Co.

LONDON (BETHNAL GREEN).—Drainage plans passed by B.C.: 73, Church-street, by Mr. S. Krogniski; "Cordwainers' Arms" beerhouse, 16, Henrietta-street, by Mr. G. Crabb; 307, Cambridge-road, by Mr. S. Weiner; 60, Virginia-road, by Messrs. Andrews & Peascod; Cordova Works, Cordova-road, by Messrs. Chilcott & Anstee, Ltd.; 137, Green-street, by Mr. G. Chandler.

LONDON (HACKNEY).—Plans passed by B.C.: Alterations, Hackney Station, for Mr. C. Harvey; rebuilding portion of 171, Lower Clapton-road, for Mr. W. B. Hallett and Messrs. Fox & White; garage, Sherry's Timber Wharf, Homerton Bridge, for Mr. E. Sherry; drainage, Phœnix Works, Sprig-lane, for W. Shurmen & Sons; drainage, 37, Groombridge-road, for Messrs. W. T. Reeve & Son; drainage, 61, Clapton-common, for T. W. Kingsland & Son; drainage, 109, Sandringham-road, for Messrs. R. Brown Bros.; drainage, 169, Mount Pleasant-lane, for Messrs. E. A. Roome & Co.

LONDON (STOKE NEWINGTON).—Drainage plans passed by B.C.: At "Ebor Arms," for Mr. G. Barker; at 23, Bethune-road, for Mr. A. C. Cann; at 109, Stoke Newington-road, for Mr. J. Ashton; at 2, Princes-road, for Mr. E. Cannell; at 51, Woodberry-grove, for Messrs. W. J. Smith & Co.; at 178, Albion-road, for the Economic House Drainage Co.; at 49 and 51, Kynaston-road, for Mr. J. Akam; at 104, Church-street, for Mr. I. W. Pickering; at 95, Lordship-road, for Messrs. S. Goodall & Son; at 30, Woodberry Down, for executors of Mr. J. Aukland.

LONDON (WANDSWORTH).—Plans passed by B.C.: Messrs. Allen & Son, addition to bakehouse, 564, Streatham High-road; Messrs. G. Everitt & Sons, Ltd., urinal, "King's Head" public house, Upper Tooting-road, Balham; Messrs. Crabb & Son, garage, 90, Palace-road, Streatham, abutting on Kinfauns-road; Messrs. J. Garrett & Son (i) re-drainage of 39, Old Town, Clapham North (ii) additions to drains, 99, Balham High-road; Mr. W. R. Mulliner, redrainage of 55, Wimbledon Park-road, Southfield; Messrs. Gripper & Wilkins, alterations to drains, Wandsworth Borough Memorial Maternity Home, Beechcroft-road, Balham; Messrs. E. & A. Wates house, Birchwood-road, Streatham; The Economic House Drainage Repairing Co., Ltd., redrainage of 29, West Side, Wandsworth Common, Fairfield; Mr. G. Diggins, garage, 42, Oxford-road, Putney; Messrs. W. Moss & Sons, Ltd., one-story addition, 101, High-street, Clapham; Messrs. Edwin Evans & Sons, water-closets and lavatory accommodation, 100 & 102, East-hill and 6, Fairfield-street, Fairfield; Mr. W. E. Higgs, redrainage, Springfield Mental Hospital, Beechcroft-road, Springfield; Messrs. W. Jones & Sons (i) twenty houses, Longstaff-crescent, Southfield (ii) twenty houses, Beclands-road, Streatham; Messrs. T. H. Adamson & Sons (i) classroom, Putney Presbyterian Church, Upper Richmond-road, Putney (ii) garage with living accommodation, 70, Howards-lane, Putney; Messrs. A. Joyner & Sons, redrainage of 14, West Hill-road, Southfield; Messrs. H. Roffey & Sons, drains, 84 & 84A, High-street, Putney; Mr. H. G. Leslie, lavatory accommodation, Messrs. Spalding's factory, Deodar-road, Putney; Messrs. W. & C. Brown, Ltd., warehouse, next 22, Thornsett-road, Springfield; Mr. F. H. Skeens, redrainage of 381, Garratt-lane, Springfield; Messrs. B. Colley & Sons, Ltd., redrainage of 64, Christchurch-road, Streatham; Mr. D. A. Ping, six houses, Collamore-avenue, Springfield; Mr. A. Dawkins, twelve houses on the western side of Marham-gardens, Springfield; Messrs. W. Shaw & Sons, drains, &c., 51 & 53, High-street, Wandsworth; Mr. J. Cramp, garage, 63, Aragon-gardens, Streatham; Messrs. Holloways Properties, Ltd., drainage of garage, 71, Magdalen-road, Springfield; Mr. W. J. Judd, redrainage of 20, 21, 22, 23, 24, 25 & 26, White's-square, Clapham South; Mr. A. Bretzfelder, shops, 195 & 197, High-street, Wandsworth; Messrs. Swain & Selley, two shops, next "Rose and Crown" public house, Tooting Bec-road, Tooting; Messrs. W. G. Tarrant, Ltd., lavatory accommodation, 536, Garratt-lane, Springfield; Messrs. Chappell Bros., additions, 14, 16 & 18, Ritherdon-road, Balham; Messrs. R. Bilham & Son, house, next 78, Emmanuel-road, Clapham South; Mr. E. Frost, additions, 33 & 35, Upper Richmond-road, Southfield; Messrs. Holloway Bros. (London), Ltd., extensions to pavilion, Bank of England Sports Ground, Priory-lane, Putney; Mr. C. Thorp, redrainage of 51, Manor-street, Clapham North; Messrs. Meakers, additions to drains, 107, Balham High-road; Mr. J. E. White, bank, 73, High-street, Wandsworth; Messrs. G. E. Everitt & Sons, additions to 167-173, High-street, Wandsworth; Mr. C. J. Sherwood, alterations and additions, 112, Balham High-road; Messrs. H. Dakin & Co., Ltd. (i) redrainage of 2, West Hill-road, Southfield (ii) house, next 11, Castello-avenue, Putney; Messrs. T. Ruck & Son, alterations to drains, Westminster School Boathouse, Putney Embankment; Mr. E. Green, garage, "Viewfield," Viewfield-road, Southfield; Messrs. Yeoman, Spriggs & Co., garages, 10, Shrubbery-road, Streatham; Mr. C. Houghton, redrainage of 23, Bellamy-street, Balham; Messrs. J. S. Daniels & Son, garages, 253, Streatham High-road; Mr. G. W. Beattie, shop, 393, Upper Richmond-road, Putney; Mr. H. Bailey, bungalow on southern side of Kingston-road, Putney; Messrs. Chapple & Utting, twelve houses, Glencairn-road, Streatham; Mr. A. Soden, house next 35, Woodbourne-avenue, Streatham; Mr. J. Brailsford, church hall at rear of 31, Clapham Common South Side, Clapham South: Messrs. Humphreys & Allen, three houses, Crowborough-road, Streatham; Mr. C. M. Croft, lavatory accommodation at repair shop, Wandsworth, &c., Gas Co.'s premises, Fairfield-street, Fairfield.

LONDON (WESTMINSTER).—An enlargement of the railway station at Piccadilly-circus is proposed by the Underground Railway Company. Negotiations are now proceeding between the Company and the Crown authorities, and it is hoped that the work of extension may soon be put in hand.

MERIDEN.—Plans passed by R.D.C.: House and shop at Marston-green, Bickenhill, for Mr. J. Mowe, Marston-green; garage at Elmdon-road, Bickenhill, for Mr. J. W. Dickens, Elmdon-road; extension of

* See also our List of Contracts, Competitions, etc.

stables at the Racecourse, Castle Bromwich, for Birmingham Race Course Co.; bungalow at Stonebridge-road, Castle Bromwich, for Mr. C. H. Wallace; bungalow at Marston-green, Coleshill, for Mr. C. Burton; bungalow at Hurst-lane, Castle Bromwich, for Mrs. E. Wilson; bungalow at Furnace End, Over Whitacre, for Mr. F. G. Grove; bungalow at Lode-lane, Sheldon, for Mr. A. E. Mascell; bungalow at Lode-lane, Sheldon, for Mr. C. Vincent; bungalow at Lode-lane, Sheldon, for Mr. F. G. Mascall; bungalow at Common-lane, Sheldon, for Mr. H. E. Green; bungalow at Lode-lane, Sheldon, for Mr. L. H. Brown; shed at Fillongley, for Mr. Gilbert.

MERTHYR TYDFIL.—A special meeting of the Tydfil Building Committee received a communication from Mr. Berry that he would convert the old baths to swimming baths at a cost of £7,000 and present it to the town. The work is to be put in hand immediately in order that scheme may be finished in winter months. —The total sanctioned road and employment schemes of the Council amount to £140,000, of which 60 per cent. is to be contributed by the State.

NEWCASTLE-ON-TYNE.—The Newcastle Corporation Housing Committee has agreed to recommend the City Council to sanction the Rochester-street scheme for the erection of 340 houses of the Sutton dwelling type being proceeded with, as well as a further instalment of 200 dwellings on the Walker estate.—A company has been formed to acquire a site on New Bridge-street on which to erect a dancing palace, restaurant, dining-hall, &c. Mr. F. W. Kinns is the architect.

PAISLEY.—At Dean of Guild Court authority was given John Crangle, builder, 38, Canal-street, to erect a self-contained villa at Alton-road; Cochran Bros., ham-curers, 90 and 91, Causeyside-street, were granted power to make additions on and alterations to their premises.

PEMBROKE.—The T.C. has decided to carry out repairs, &c., to the Council Chamber.

PEMBROKESHIRE.—A scheme involving expenditure of £300,000 was discussed at a South Pembrokeshire municipal authorities' conference on Saturday. The scheme aims at securing water supply from Precelly Mountains for the area. The authorities concerned are Haverfordwest, Pembroke, and Tenby Town Councils, Milford Haven, Neyland and Narberth U.D.C.'s, and Haverfordwest and Narberth R.D.C.'s. The main conduit will be 2¼ miles in length to a point above Clarbeston Village, and thence by two trunk mains in opposite directions the water would be carried to localities named. Sir Evan Jones, M.P., told the conference that the water in its fall should be used for electricity generation. The conference decided that local authorities should report the extent of contributions to Haverfordwest Council.

PONTEFRACT.—A Ministry of Health inquiry has been held into the application of the R.D.C. for sanction to borrow £18,500 for the purposes of sewerage works, &c., for Airedale, a new housing site in the parishes of Ferry Fryston and Glass Houghton. The site is laid out for 1,200 houses, and the Ministry have agreed to a subsidy for as many houses as are ready for occupation by January 31st next. Over 800 houses are in course of erection, 110 are occupied, and probably 850 will be completed by the date named. The sewage scheme provides for an ultimate population of 8,000, though it is not proposed to put in works for this number at present.

POULTON.—Plans passed by U.D.C.: Manure container for exors. of C. V. Haworth, on Breck Stud Farm, Skippool-road; garage, for Mr. H. J. Byram, Hardhorn-road; wooden building, Holt's-lane, for Mr. J. Abbott; garages and sculleries to bungalows, off Skippool-road, for Mr. P. Kirkham; conversion of stable into garage, in Back Elletson-street, Poulton, for Mr. E. T. Knagg; two semi-detached villas, in Garstang new-road, for H. J. Byram; and dwelling-house, in Blackpool-road, Poulton, for Miss Stansfield.

RHOS.—It is intended to build a workmen's institute at Rhos, a populous mining district near Wrexham, at a cost of £2,000. Mr. Hugh Hughes, the financial secretary of the North Wales Miners' Association, has informed the Rhos Parish Council that the Central Committee of the Miners' Welfare Fund in London has allocated £3,000 for the cost of the building.

SOLIHULL.—Plans passed by R.D.C.: Bungalow, for Mr. F. Hawkes, Blossomfield-road; bungalow, for Mr. W. Smith, Blossomfield-road; bungalow, for Mrs. Grubham, Blossomfield-road. Mr. W. H. G. Ansell, architect; contractor, Mr. T. W. Hawkes, Solihull.

TENTERDEN.—Plans passed by R.D.C.: Garage at Rolvenden, for Mr. C. W. May, and a bungalow at Appledore, for Mr. Farmer, were approved.

UPPER RENFREWSHIRE.—The latest list of plans approved by the Buildings Committee of Upper Renfrewshire includes the following: Extension to Cartside Mills, Milliken Park, stores, colour shop, and finishing shed for Smith & M'Laurin, Ltd.; self-contained cottage at Shieldhill, Newton Mearns, for Robert Gracie, 12, Waterloo-street, Glasgow; double cottage in Brunswick-avenue, Giffnock, for John Taylor, builder, Eastwood-avenue, Giffnock; extension to Fresh Air Home at Peeswheep, Paisley Landward, for J. & P. Coats, Ltd., 50, Bothwell-street, Glasgow; steam laundry at Halfway House, Cardonald, for A. Scott & Co.; addition to dwelling-house, Craigminn, 17, Rowand-avenue, Giffnock, for John Thomson; and self-contained cottage at Waterside, near Hurlet, for James Frew, Darnley, Nitshill.

UXBRIDGE.—Plans passed by R.D.C.: Addition of scullery to bungalows, Judge Heath-lane, Hillingdon; conversion of stables into dwelling-house, Hillingdon; the erection of a cottage, Wise-lane, West Drayton; and of a cottage in Warwick-road, West Drayton.

WAKEFIELD.—Plans passed by the T.C.: Mr. J. Lithgoe, boiler and engine house on Stennard Island, for the Diamond Coal Cutter Co., Ltd.: Mr. T. W. Taylor, conversion of office and stores into office, shop, and store in King-street: Messrs. Massie & Holdsworth, alterations and additions to house in Dewsbury-road, for Mr. T. North; Mr. Fred Simpson, additions to works in Craven-street, for Messrs. Blackburn & Crawshaw; Messrs. Massie & Holdsworth, motor garage to house in Sandal-avenue, for Mr. H. Goodwin; Mr. J. P. Firth, alterations and additions to garage in Albion-court, for Mr. Walter Judge.

WALTON-LE-DALE.—Plans passed by U.D.C.: Two houses in Wateringpool-lane, for J. Clayton; bungalow in Wateringpool-lane, for R. S. Peacock; conversion of farm buildings to a dwelling-house at Pump House Farm, Back-lane; refreshment hut and dressing-room on the south side of the River Ribble, adjoining the Tram Bridge, for Mr. C. Ashton.

WIGTON.—Plans passed by R.D.C.: Two semi-detached houses at Waverbridge, for Mr. A. Wheeler; new farm buildings, Lesson Hall, for Mr. Dixon.

WILLESDEN.—Plans passed by U.D.C.: Motor garage, 179, Walm-lane, Cricklewood, by Mr. C. D. Munn, for Mr. N. Hymans; alterations to exits of school, College-road, Kensal Rise, by and for the Rev. Mother Superior (A. M. Worsfold); two houses, Chatsworth-road, Cricklewood, for Mr. C. W. B. Simmonds; motor garage at rear of Langton and Wotton-roads, Cricklewood, by Mr. Jesse Catton, for Broadway Properties, Ltd; motor garage at "Meloch" Harlesden-road, by Messrs. Trant, Brown & Brightiff, for Mr. W. M. Bolton; addition to factory, Pound-lane, Willesden, by Mr. G. W. Atkinson, for Messrs. Studebaker, Ltd.; motor garage, 18, Mount Pleasant-road, by Messrs. Trant Brown & Brightiff, for Mr. W. Glanville; bay windows, Dudden Hill-lane, Willesden, by and for Mr. J. Easton; alterations and additions, 143, Villiers-road, Willesden Green, by Mr. H. F. Wilkins for Mr. J. B. Mumford; four houses, 45A, 45B, 45C, 45D, Gladstone Park-gardens, Cricklewood, for Mr. F. W. Brealy; alterations to shop, 73, Albert-road, Kilburn, by Mr. G. A. Sexton for Mr. C. Waller; roof over part of yard at Warfield-road, Kensal Green, by Mr. G. A. Sexton for Messrs. R. Bunce & Co.; additions and alterations to factory, Edgware-road, Cricklewood, by and for H.M. Office of Works; house with motor garage, 76, Chatsworth-road, Cricklewood, for Mr. C.W.B. Simmonds; research laboratory, Acton-lane, Harlesden, by Mr. C. W. Box for the British Launderers' Research Association; addition to motor garage, 20, Brondesbury Park, Brondesbury, by Mr. C. Graham for Mr. J. E. Barnard; two houses, with garages, Sidmouth-road, Brondesbury, by Mr. F. Stanley Allen, for Mr. T. Western; motor garage, 2, Stanley-gardens, Cricklewood, by and for Mr. H. Edmunds; motor garage, 25, Chichele-road, Cricklewood, for Dr. H. S. Faber.

WOKING.—Plans for a new mission-hall at the junction of Courtenay-road and Omega-road, submitted by the trustees of the Courtenay-road Mission, have been approved by the U.D.C.

YARMOUTH.—The Corporation is considering a scheme for making an amphitheatre and bandstand in Gorleston cliffs at a cost of £14,700.

FIRES.

AYR.—Damage estimated at about £1,800 has been done by a fire which broke out at Dinwoodie House, near Hollybush, occupied by Mr. Millar.

BURNLEY.—A large three-story cotton warehouse in Burnley has been destroyed by fire. The building belongs to the Leeds and Liverpool Canal Company, and was occupied by Mr. H. Holroyd, waste merchant.

COVENTRY.—A large motor works took fire last week, and six of the nine shops belonging to Messrs. Hollick & Pratt were destroyed.

GLASGOW.—Damage estimated at £2,500 has been caused by an outbreak of fire in premises occupied by the Glenpark Wool Flock Company, flock manufacturers, 200, Glenpark-road.

LINLITHGOW.—Damage amounting to several thousands of pounds was caused by a serious outbreak of fire which has occurred at Rivaldsgreen Tannery belonging to Messrs. J. B. Thomas & Co., Ltd.

LONDON.—Premises in Park-street, Southwark, S.E., occupied by Messrs. J. Parry & Co., Ltd., printers and stationers, have been severely damaged by fire.

MILLWALL.—A serious outbreak of fire has occurred at the factory of Messrs. Levey Bros. & Knowles, Ltd., sack and bag merchants, 58, West Ferry-road.

ST. OSYTH.—A fire has occurred at the Maltings, the Quay, St. Osyth, in the occupation of Mr. Joseph Parish, seed grower, Braziere Farm.

SCARBOROUGH.—Over £3,000 worth of damage was done by a fire at a Japanese curio and art shop in Marine-parade.

SELLY OAK.—An outbreak of fire at a motor garage in High-street, owned by Alfred Thomas Gittens, has caused severe damage.

TEIGNMOUTH.—Between £2,000 and £3,000 worth of damage was done by a fire which broke out at the Agra Engineering Company's works, Old Quay.

Cardiff Street Improvement.

Mr. Howard Martin, Official Arbitrator, sitting at the City Hall, Cardiff, heard a claim by Messrs. R. P. Culley & Co., Ltd., against the Lord Mayor, Alderman and Citizens of the City of Cardiff, regarding the Corporation's compulsory acquisition of the Law Courts Hotel, Kingsway and Duke-street, Cardiff, for the purpose of the Duke-street improvement.

Considerable evidence was given, and the Arbitrator, who reserved his decision, has since issued his award as follows:—"That the Acquiring Authority is to pay the claimants the sum of £13,510, it being agreed that the portion of the premises coloured blue on the plan produced at the hearing and not included in the notice to treat is to be included in the award, and that the claimants are to continue in occupation of the premises until March, 1923; and I order the claimants to pay the costs of the Acquiring Authority."

PATENTS.

APPLICATIONS PUBLISHED.*

182,523.—F. Spring, junr.: Walls constructed of hollow bricks.

182,583.—J. Conlon and A. Greenshields: Ventilator for galvanised iron or wood erections.

182,682.—A. Knapen: Building-blocks.

183,158.—J. Michaels: Desk cabinets.

183,162.—E. L. Pease: Radiators for heating buildings.

183,177.—F. Gunter: Oil and varnish colours miscible with water.

183,192.—F. W. Shiel (A. Hieber): Balancing-devices for hand-operated sliding windows.

183,206.—W. Heyd: Plaster lathings.

183,232.—J. A. Davies: Manufacture of concrete blocks for forming flooring and like purposes.

183,250.—H. Thompson and S. H. Thompson: Concrete and like building construction.

183,255.—T. W. Greenwood: Louvred or ventilating windows.

183,286.—M. Motz: Locks operated by revolving-barrel mechanism.

183,305.—A. H. Roe: Wood-block floorings.

183,307.—L. Shingleton: Adjustable forms and bearers for supporting shuttering for concrete floors and beams.

183,309.—J. C. Gibson: Bolt and socket fastenings.

183,331.—R. Rossi: Packing-case.

183,387.—G. F. Nicholson: Adjustable door hinge.

183,402.—F. J. Pavleitch: Dancing floors.

183,493.—C. S. F. Bilbrough: Pipe joints and connections.

183,495.—H. Simon, Ltd., and C. P. Kininmonth: Elevators.

183,506.—J. McArtney: Method of securing a cement or plaster facing to building-slabs, troughings, and to the coverings of girders or boilers.

183,509.—J. A. Malcolm: Blocks for building and constructional purposes.

183,530.—W. H. Griffiths: Roof and the like coverings.

183,536.—O. Stromborg: Means and methods for forming temporary structures for various uses.

183,545.—A. Campbell and W. I. Miller: Redecoration of buildings.

183,546.—G. E. G. Leith: Reinforced block-work floors, walls, roofs, vaults and domes.

183,548.—J. W. Davison and H. Bramwell: Concrete-mixing machines.

183,554.—D. J. Williamson and E. A. Knight: Window holders or supports for unbalanced sliding sashes.

183,594.—D. B. Bellamy: Fastenings for windows and doors.

183,615.—B. Morton: Revetments, groynes, foundations, and walls.

183,620.—S. Horton and T. E. Burnett: Flushing apparatus.

183,631.—Phi-Kappa Syndicate, Ltd., and J. J. J. M. Kluijtmans: Electric heating devices or elements.

183,640.—C. W. Holcroft: Kinema theatres and other structures.

183,648.—J. K. Paton: Machine or mould for the purpose of moulding concrete blocks.

183,668.—L. S. Dyer: Hinges for field gates.

183,679.—F. Sage & Co., Ltd., and S. C. Hawes: Sectional furniture.

183,681.—T. R. Leigh: Fire-grates.

185,687.—A. E. Farwell: Hinges.

179,502.—J. Gairing: Stoking devices for brick kilns.

183,735.—C. A. Haward: Reinforced reversible stair tread.

183,737.—T. Anderson: Means for binding hollow walls.

183,743.—J. S. White and J. P. White: Doors and shutters.

183,753.—J. Frankfurter and E. A. Jansen: Process for the manufacture of coverings for floors and walls.

* All these applications are now in the stage in which opposition to the grant of Patents upon them may be made.

PRICES CURRENT OF MATERIALS.*

[Owing to the exceptional circumstances which prevail at the present time, prices of materials should be confirmed by inquiry.—Ed.]

BRICKS, &c.

	£ s. d.
Per 1,000 Alongside, in River Thames up to London Bridge.	
Best Stocks	4 2 0
Second Hard Stocks	3 17 0
Per 1000. Delivered at London Goods Stations.	
Flettons, at King's Cross	3 1 0
Do. grooved for plaster	3 3 0
Do. Bullnose	3 16 0
Best Stourbridge Fire bricks:— 2½ in.	11 3 0
3 in.	13 2 0
GLAZED BRICKS—	
Best White, Ivory, and Salt Glazed Stretchers	24 0 0
Headers	23 10 0
Quoins, Bullnose and 4½in. Flats	30 10 0
Best Blue Pressed Staffs.	10 1 6
Do. Bullnose	10 11 6
Blue Wire Cuts	8 1 6
D'ble Str'tch'rs	32 10 0
D'ble Headers	29 10 0
One Side and two Ends	33 10 0
Two Sides and one End	34 10 0
Splays and Squints	32 0 0

Second Quality, £1 per 1,000 less than best. Cream and buff, £2 extra over white. Other colours, Hard Glaze, £5 10s. extra over white.

	s. d.	
Thames Ballast	13 6	per yard,
Pit Sand	16 0	„ „
Thames Sand	16 6	„ „
Best Washed Sand	16 6	„ „
½ in. Shingle for Ferro-Concrete	14 0	„ „
4 in. „	15 0	„ „
¾ in. Broken Brick	10 6	„ „
Pan Breeze	5 6	„ „

delivered 2 miles radius Paddington.

Per ton delivered in London area in full van loads.

	£ s. d.
Best Portland Cement. British Standard Specification Test £3 3 0	£3 8 6
56/- alongside at Vauxhall in 80-ton lots.	
Ferrocrete per ton extra on above	10 0
Roman Cement	8 15 0
Parian Cement	5 17 0
Keene's Cement, White	5 17 0
„ „ Pink	5 12 0
Plaster, Coarse, Pink	3 10 0
„ „ White	3 17 8
„ Fine	5 12 0
Sirapite, Coarse	3 16 0
„ Finish	4 4 0
Grey Stone Lime	2 16 6
Chalk Lime	2 16 6
Best Ground Blue Lias Lime	2 18 6
Hair	17 0 0
Granite Chippings	1 12 0

NOTE.—Sacks are charged 1s. 9d. each and credited 1s. 6d. if returned in good condition within three months, carr. pd.

Stourbridge Fireclay in s'cks 37s. 6d. per ton at rly. dpt.

STONE.

	s. d.
BATH STONE—delivered in railway trucks at Westbourne Park, Paddington, G.W.R., or South Lambeth, G.W.R., per ft. cube	3 1
Do. do. delivered in railway trucks at Nine Elms, L. & S.W.R., per ft. cube	3 4
Do. do. delivered on road wagons at Nine Elms Depot	3 5
PORTLAND STONE— Brown Whitbed, in random blocks of 20 ft. average, delivered in railway trucks at Nine Elms, L. & S.W.R., South Lambeth Station, G.W.R., and Westbourne Park, Paddington, G.W.R., per ft. cube	4 7
Do. do. delivered on road wagons at above stations, per ft. cube	4 8

White basebed, 3d. per ft. cube extra.

NOTE.—½d. ft. cube extra for every foot over 20 ft. *average*, and ¼d. beyond 30 ft.

	s. d
YORK STONE, BLUE—*Robin Hood Quality.* Delivered at any Goods Station London.	
6 in. sawn two sides landings to sizes (under 30 ft. super.) Per Ft. Super	5 10½
6 in. rubbed two sides, ditto „	6 4½
3 in. sawn two sides slabs (random sizes) „	2 5½
2 in. to 2½ in. sawn one side slabs (random sizes) „	1 6½
1½ in. to 2 in. ditto, ditto „	1 4
HARD YORK— Delivered at any Goods Station London.	
Scappled random blocks Per Ft. Cube	6 0
6 in. sawn two sides landing to sizes (under 40ft. super.) Per Ft. Super	5 4½
6 in. rubbed two sides ditto „	6 0½
4 in. sawn two sides slabs (random sizes) „	2 10
3 in. ditto, ditto „	2 5½
2 in. self-faced random flags Per Yard Super	8 4

ARTIFICIAL STONE.

	s. d.
Delivered in London Area in full van loads.	
Plain	8 6 per ft. cube
Moulded	10 0 „ „
Cills	11 0 „ „

WOOD.

GOOD BUILDING DEAL.

Inches	per stan.	Inches	per stan.
4 × 11	£36 0	3 × 6	£22 10
4 × 9	36 0	3 × 11	35 0
4 × 8	30 0	2 × 11	35 0
4 × 7	30 0	3 × 9	35 0
3 × 8	30 0	2½ × 9	30 0
3 × 7	25 0	3 × 4½	20 10
2½ × 7	22 10	3 × 4	20 10

PLANED BOARDS.

1 × 11	42 10	1 × 9	37 10

PLAIN EDGE FLOORING.

Inches	per sq.	Inches	per sq.
¾	20/-	1¼	32/6
¾	22/6	1½	44/-
1	25/-		

WOOD (*Continued*).

TONGUED AND GROOVED FLOORING. Inches	per sq.
1	25/-
1¼	32/6
1½	44/-

MATCHINGS (BEST). Inches	per sq.
¾	17/6
¾	22/6
1	25/-

Inches	BATTENS.	s. d.
¾ × 2		3 0 per 100 ft.

SAWN LATHS.

	s. d.
Per bundle	0 3 9

Dry Wainscot Oak, per ft. super, as inch	0 2 6	to	0 3 0	
¼ in. do.	0 1 10½	to	0 2 6	
Dry Mahogany—Honduras, Tabasco, African, per ft. super, as inch	0 2 3	to	0 3 0	
Cuba Mahogany	0 3 6	to	0 4 0	
Teak (Rangoon, Moulmein or Java), per load	52 10 0	to	55 0 0	
American Whitewood planks, per ft. cube	0 16 0	to	0 18 0	
Best Scotch Glue, per cwt.	6 15 0	to	—	
Liquid Glue, per cwt.	4 7 0	to	5 10 0	

SLATES.

1st quality slates from Bangor or Portmadoc in truck load delivered London area. Per 1,000 of 1,200.

	£ s. d.		£ s. d.
24 by 12	46 10 0	18 by 10	26 5 0
22 by 12	42 5 0	18 by 9	23 2 6
22 by 11	39 0 0	16 by 10	22 0 0
20 by 12	37 2 6	16 by 8	17 2 6
20 by 10	31 15 0		

TILES.

	Per 1,000 f.o.r. London. £ s. d.
Best machine-made tiles from Broseley or Staffordshire district	6 0 0
Ditto hand-made ditto	6 10 0
Ornamental ditto	6 15 0
Hip and valley tiles (per dozen) { Hand made	0 8 6
Machine made	0 8 0

METALS.

	£ s. d.
JOISTS, GIRDERS, &c., TO LONDON STATION PER TON—	
R. S. Joists, cut and fitted	14 0 0
Plain Compound Girders	16 0 0
„ Stanchions	18 0 0
In Roof Work	21 0 0

WROUGHT IRON TUBES AND FITTINGS—

(Discount off List for lot of not less than £15 net value delivered direct from Works. 5 per cent. less above gross discounts, carriage forward if sent from London Stocks.)

	Tubes. (all sizes).	Fittings. Up to 2".	Fittings. Over 2".	Flanges. Up to 2".	Flanges. Over 2"
Gas	55 %	50 %	55 %	60 %	65 %
Water	50 %	45 %	50 %	55 %	60 %
Steam	45 %	40 %	45 %	50 %	55 %
Galv'd—					
Gas	45 %	42½ %	47½ %	52½ %	57½ %
Water	37½ %	37½ %	42½ %	47½ %	52½ %
Steam	27½ %	32½ %	37½ %	42½ %	47½ %

L.C.C. COATED SOIL PIPES—London Prices ex works.

	Pipe. s. d.	Bends, stock angles. s. d.	Branches, stock angles. s. d.
2 in. per yd. in 6fts plain	3 2½	2 5	2 11
2½ in. „	3 9½	2 8	3 8
3 in. „	4 5½	2 11	4 4
3½ in. „	4 10½	3 8	5 1
4 in. „	5 5	4 1	5 10

RAIN-WATER PIPES, &c.

	Pipe. s. d.	Bends, stock angles. s. d.	Branches, stock angles. s. d.
2 in. per yd. in 6fts. plain	1 10½	1 4½	1 10½
2½ in. „ „	2 1	1 7½	2 3
3 in. „ „	2 6	2 0	3 0
3½ in. „ „	2 11	2 4½	3 6
4 in. „ „	3 5	2 10½	4 3

L.C.C. DRAIN PIPES.—9 ft. lengths. London Prices per yd.: 4 in., 5/3. .. 5 in., 6/9. .. 6 in., 8/-.

IRON—	Per ton in London. £ s. d.	£ s. d.
Common Bars	13 0 0 to	14 0 0
Staffordshire Crown Bars — good merchant quality	14 0 0 ..	15 0 0
Staffordshire "Marked Bars"	16 0 0 ..	17 0 0
Mild Steel Bars	12 0 0 ..	13 0 0
Steel Bars, Ferro-Concrete quality, basis price	12 0 0 ..	13 0 0
Hoop Iron, basis price	15 0 0 ..	16 0 0
„ „ Galvanised	29 0 0 ..	31 0 0
Soft Steel Sheets, Black— Ordinary sizes to 20 g.	14 0 0 ..	15 0 0
„ „ „ 24 g.	15 0 0 ..	16 0 0
„ „ „ 26 g.	16 10 0 ..	18 10 0
Sheets Flat Best Soft Steel, C.R. & C.A. quality— Ordinary sizes, 6ft. by 2ft. to 3ft. to 20 g.	21 0 0 ..	22 0 0
Ordinary sizes, 6ft. by 2ft. to 3ft. to 22 g. and 24 g.	22 0 0 ..	23 0 0
Ordinary sizes, 6ft. by 2ft. to 3ft. to 26 g.	24 0 0 ..	26 0 0
Flat and Galvanised Corrugated Sheets— Ordinary sizes, 6 ft. to 9ft. 20 g.	20 0 0 ..	21 0 0
Ordinary sizes, 6ft. to 9ft. 22 g. and 24 g.	20 10 0 ..	21 10 0
Ordinary sizes, 6ft. to 9ft. 26 g.	22 10 0 ..	23 10 0

METALS (*Continued*).

	Per ton in London. £ s. d.	£ s. d.
Sheets Galvanised Flat, first quality— Best Soft Steel Sheets, 6ft. by 2ft. to 3ft. to 20g. and thicker	24 0 0 ..	25 0 0
Best Soft Steel Sheets, 22 g. and 24 g.	25 0 0 ..	26 0 0
Best Soft Steel Sheets, 26 g.	26 10 0 ..	27 10 0
Cut Nails, 3in. to 6in. (under 3in. usual trade extras.)	23 0 0 ..	24 0 0

METAL WINDOWS—Standard sizes suitable for complete houses, including all fittings, painting two coats, and delivery to job, average price about 1/4 to 1/7 per foot super.

LEAD, &c.

	Delivered in London. £ s. d.	£ s. d.
LEAD—Sheet, English, 4 lb. and up	34 10 0 ..	—
Pipe in coils	35 0 0 ..	—
Soil Pipe	37 10 0 ..	—
Compo pipe	38 10 0 ..	—

NOTE—Country delivery, 30s. per ton extra; lots under 5 cwt., 1s. 6d. per cwt. extra. Cut to sizes, 2s cwt. extra.

Old lead, ex London area, at Mills per ton	21	0	0 .. —
Do., ex country, carriage forward per ton	22	0	0 .. —

	£ s. d.	
COPPER— Strong Sheet per lb.	0 2 3	.. —
Thin „ „	0 2 4	.. —
Copper nails „	0 2 3	.. —
Copper wire „	0 2 4	.. —
TIN—English Ingots „	0 1 9	.. —
SOLDER—Plumbers' „	0 0 10	.. —
Tinmen's „	0 1 0	.. —
Blowpipe „	0 1 3	.. —

GLASS.

ENGLISH SHEET GLASS IN CRATES OF STOCK SIZES AND IN SQUARES IN ORDINARY SIZES.

	Per Ft.		Per Ft.
15 oz. fourths	3½d.	32 oz. fourths	8½d.
„ thirds	4½d.	„ thirds	10d.
21 „ fourths	5½d.	Obscured Sheet, 15 oz.	6½d.
„ thirds	6d.	21 „	7d.
26 „ fourths	6½d.	Fluted and Enamelled 15 „	8½d.
„ thirds	7½d.	21 „	10½d.

Extra price according to size and substance for squares cut from stock.

ENGLISH ROLLED PLATE IN CRATES OF STOCK SIZES.

	Per Ft.
Rolled plate	4½d.
Rough rolled	5½d.
Rough rolled	8½d.
Figured Rolled, Oxford Rolled, Baltic, Oceanic Arctic, Stippolyte, and small and large Flemish white	6½d.
Ditto, tinted	9½d.
Rolled Sheet	6d.
White Rolled Cathedral	5½d
Tinted do.	7½d

Cast Plate is same price as rough rolled.

PAINTS, &c.

	£ s. d.
Raw Linseed Oil in pipes per gallon	0 3 5
„ „ „ in barrels „	0 3 7
„ „ „ in drums „	0 3 10
Boiled „ „ in barrels „	0 3 11
„ „ in drums „	0 4 1
Turpentine in barrels „	0 3 4
„ in drums (10 gall.) „	0 3 7
Genuine Ground English White Lead, per ton (In not less than 5 cwt. casks.)	54 5 0
GENUINE WHITE LEAD PAINT— "Father Thames," "Nine Elms," "Park," "Supremus" and other best brands (in 14 lb. tins) not less than 5 cwt. lots per ton delivered	75 10 0
Red Lead, Dry (packages extra) per ton	38 0 0
Best Linseed Oil Putty per cwt.	0 17 0
Filocol per cwt.	0 15 6
Size. X D Quality fkn.	0 3 6

VARNISHES, &c.

	Per gallon. £ s. d.
Oak Varnish Outside	0 14 0
Fine ditto ditto	0 16 0
Fine Copal ditto	0 18 0
Pale Copal ditto	1 0 0
Pale Copal Carriage ditto	1 4 0
Best ditto ditto	1 12 0
Floor Varnish Inside	0 18 0
Fine Pale Paper ditto	0 18 0
Fine Copal Cabinet ditto	1 2 6
Fine Copal Satting ditto	1 0 6
Hard drying Oak ditto	0 18 0
Fine Hard drying Oak ditto	0 19 0
Fine Copal Varnish ditto	1 0 0
Pale ditto ditto	1 2 0
Best ditto ditto	1 12 0
Best Japan Gold Size	0 12 0
Best Black Japan	0 14 0
Oak and Mahogany Stain (water)	0 12 0
Brunswick Black	0 9 0
Berlin Black	0 14 0
Knotting (patent)	1 5 0
French and Brush Polish	1 2 6
Liquid Dryers in Terebine	0 12 6
Cuirass Black Enamel	0 7 0

* The information given on this page has been specially compiled for THE BUILDER and is copyright. Our aim in this list is to give, as far as possible, the *average* prices of materials, not necessarily the highest or lowest. Quality and quantity obviously affect prices—a fact which should be remembered by those who make use of this information.

CURRENT PRICES FOR BUILDING WORK IN LONDON.*

EXCAVATOR.

		s.	d.
Digging and throwing or wheeling and filling carts, and carting away to shoot—6 ft. deep	per yard cube	15	0
Add if in clay	" "	1	6
Add for every additional depth of 6 ft.	" "	0	9
Planking and strutting to trenches	per foot super	0	7
Do. to sides of excavation, including shoring	" "	1	2

CONCRETOR.

		s.	d.
Portland cement concrete in foundation 1 to 6 ..	per yard cube	40	0
Add if in underpinning in short lengths	" "	9	0
Add if in floors 6 in. thick	" "	3	9
Add if in beams	" "	4	6
Add if aggregate 1 : 2: 4	" "	11	0
Add for hoisting not exceeding 10 ft. beyond the first 10 ft.	" "	3	6

BRICKLAYER.

		£	s.	d.
Reduced brickwork in lime mortar and Fletton bricks	per rod	34	0	0
Add if in stocks	"	8	10	0
Add if in Staffordshire blues	"	24	0	0
Add if in Portland cement and sand	"	3	0	0

FACINGS.

		s.	d.
Extra for facing in English or Flemish bond for every 10s. per 1,000 over the price of the common bricks	per ft. super	0	0	1½

POINTING.

		s.	d.
Neat flat struck or weathered joint....	" "	0	0	3

ARCHES.

		s.	d.
Extra only to the price of ordinary brickwork :—			
Fair external in half brick rings	" "	0	0	10
Axed in stocks	" "	0	1	9
Rubbed and gauged jointed in putty camber or segmental	" "	0	6	0

SUNDRIES.

		s.	d.
Damp course in double course of slates breaking joint and bedded in Portland cement	" "	0	1	3
Setting ordinary register grates and stoves	each	1	1	0
Setting kitchener, including forming flues, &c., with all necessary fire bricks	"	5	5	0

ASPHALTER.

		s.	d.
Half-inch horizontal damp course	per yard sup.	7	6
Three-quarter-inch vertical damp course	" "	11	0
½ inch on flats in two thicknesses....	" "	8	6
Angle fillet	per foot run	0	3
Skirting and fillet 6 in. high	" "	1	4

MASON.

		s.	d.
York stone templates fixed	per foot cube	16	3
York stone sills fixed	" "	28	6
Bath stone and all labour fixed	" "	12	0
Portland stone fixed	" "	21	6

SLATER.

		s.	d.
Welsh 16 in. × 8 in. 3 in. lap, including nails....	per square	79	9
Do. 20 in. × 10 in. Do. Do.	"	90	9
Do. 24 in. × 12 in. Do. Do.	"	99	0

CARPENTER AND JOINER.

		s.	d.
Fir framed in plates	per foot cube	5	6
Do. joists	" "	6	0
Do. roofs, floors and partitions	" "	6	6
Do. trusses	" "	8	6

		¾"	1"	1¼"	2"
Deal rough close boarding	per sq.	42/-	48/-	56/-	85/-

		s.	d.
Flat centering for concrete floor, including struts or hangers .. "		60	0
Do. to beams	per ft. sup.	1	6
Centres for arches	"	2	0
Gutter boards and bearers	"	1	1

FLOORING.		¾"	1"	1¼"	1½"
Deal edges shot	per sq.		49/-	58/-	67/-
Do. tongued and grooved	"		54/-	65/-	72/-
Do. matchings	"	45/-	55/-		
Moulded skirting, including backings and grounds	per ft. sup.	1/8	2/1	2/3	2/9

SASHES AND FRAMES.		s.	d.
One-and-a-half moulded sashes or casements	per foot super	1	10
Two Do. Do.	" "	2	3
Add for fitting and fixing	" "	0	6
Deal-cased frames with 1 in inner and outer linings, 1½ in. pulley stiles tongued to linings, hard wood sills with 2 in. moulded sashes in squares double hung, double hung with pulleys, lines and weights ; average size....	" "	4	0

DOORS.		1½"	1¾"	2"
Two-panel square framed	per ft. sup.	2/4	2/7	2/9
Four-panel Do.	"	2/8	3/0	3/3
Two-panel moulded both sides	"	3/0	3/3	3/6
Four-panel Do. Do.	"	3/3	3/7	3/10

CARPENTER AND JOINER—continued.

FRAMES.		1"	1¼"	1½"
Deal wrot moulded and rebated	per foot cube			14 0
Plain deal jamb linings framed	per ft. sup.	1/9	1/10	2/1
Deal shelves and bearers	"	1/6	1/8	1/11
Add if cross tongued	"	2d.	2d	2d

STAIRCASES.	1"	1¼"	1½"	2"	2½"
Deal treads and risers in and including rough brackets	2/1	2/4	2/9	—	—
Deal strings wrot on both sides and framed	1/8	2/-	2 2	2/8	—

		s.	d.
Housings for steps and risers	each	0	11
Deal balusters, 1 in. × 1½ in.	per ft. run.	0	9
Mahogany handrail ; average 3 in. × 3 in.	" "	6	0
Add if ramped	" "	11	10
Add if wreathed	" "	23	9

FIXING ONLY IRONMONGERY (INCLUDING SCREWS).

6 in. barrel bolts	8½d.	Rim locks	2/4
Sash fasteners	11½d.	Mortice locks	5/3
Casement fasteners	1/5	Patent spring hinges and letting in to floor and making good	19/-
Casement stays	1/2		
Cupboard locks	1/5		

FOUNDER AND SMITH.

		s.	d.
Rolled steel joists	per cwt.	17	0
Plain compound girders	"	20	0
Do. stanchions	"	23	0
In roof work	"	28	0

RAIN-WATER GOODS.

		3"	4"	5"	6"
Half-round plain rebated joints ..	ft. run	1/11	2/4½	3/7	4/-
Ogee Do. Do. ..	"	2/4½	3/1	3/10	4/9
Rain-water pipes with ears	"	2/9	3/7		
Extra for shoes and bends	each	4/4	5/11		
Do. stopped ends	"	1/11	2/4½	3/7	4/-
Do. nozzles for inlets	"	2/2	2/7	3/10	4/3

PLUMBER.

		s.	d.
Milled lead and laying in flashings and gutters	per cwt.	56	0
Do. Do. in flats	"	52	0
Extra labour and solder in coated cesspools	each	7	4
Welt joint	per ft. run.	0	6
Soldered seam	" "	1	10
Copper nailing	" "	0	7

		½"	¾"	1"	1½"	2"	4"
Drawn lead waste	per ft. run	10d.	1/6	1/9	3/1	3/10	
Do. service	"	1/5	1/11	2/3	3/6		
Do. soil	"						6/2
Bends in lead pipe	each					3/3	8/2
Soldered stop ends	"	1/2	1/8	2/1	2/10	3/6	
Red lead joints	"	11d.	1/-	1/3	1/11	2/4	4/10
Wiped soldered joints	"	2/10	3/6	4/-	4/11	6/6	9/9
Lead traps and cleaning screws	"				14/7	19/6	
Bib cocks and joints ..	"	6/4	9/7	15/4	41/-		
Stop cocks and joints	"	15/4	17/2	25/8	64/-		

PLASTERER.

			s.	d.
Render, float and set in lime and hair	per yard sup.		2	9
Do. Do. Sirapite	"	"	2	11
Do. Do. Keen's	"	"	4	0
Add sawn lathing	"	"	1	7
Add metal lathing	"	"	2	10
Portland cement screed	"	"	2	1
Do. plain face	"	"	3	9
Mouldings in plaster	per 1 girth		0	3
One-and-a-half granolithic pavings	per yard sup.		6	4

GLAZIER.

			s.	d.
21 oz. sheet plain	per foot sup.		1	1
26 oz. Do.	"	"	1	4
Obscured sheet	"	"	1	8
¼ in. rolled plate	"	"	1	0
¼ in. rough rolled or cast plate	"	"	1	1
½ in. wired cast plate	"	"	1	7

PAINTER.

			s.	d.
Preparing and distempering, 2 coats	per yard sup.		1	0
Knotting and priming	"	"	0	8
Plain painting 1 coat	"	"	0	11
Do. 2 coats	"	"	1	7
Do. 3 coats	"	"	2	4
Do. 4 coats	"	"	3	0
Graining	"	"	2	5
Varnishing twice	"	"	1	11
Sizing	"	"	0	4
Flatting	"	"	0	8
Enamel	"	"	1	3
Wax polishing	per foot sup		0	9
French polishing	"	"	1	3
Preparing for and hanging paper	per piece		2/- to 4/-	

* These prices apply to new buildings only. They cover superintendence by foreman and carry a profit of 10% on the prime cost without establishment charges. A percentage of 1½ should be added for Employers' Liability and National Health and Unemployment Acts and from 1s. 6d. per £100 for Fire Insurance. The whole of the information given on this page is copyright.

TENDERS.

Communications for insertion under this heading should be addressed to "The Editor," and must reach him *not later than Tuesday evening.*

* Denotes *accepted.* † Denotes *provisionally accepted.*
‡ Denotes *recommended for acceptance.*
§ Denotes *accepted subject to modifications.*

ALTON (HANTS.).—For the construction of percolating filters, humus tanks, &c., at sewage works, for the U.D.C. Mr. George H. Webb, Engineer and Surveyor, Town Hall, Alton, Hants. :—

W. E. Lee, High Wycombe	£7,139 16 11
H. Pittard & Son, Langport	6,744 0 0
H. Osman & Co., Southampton	6,644 11 11
Campbell, Kenyon & Co., Acton	6,506 6 4
Warwick & Co., Botley	6,256 12 11
H. Middleton, Newnham	6,065 9 3
Johnson & Langley, Newport	5,997 10 0
Streeter, Godalming	5,893 0 0
Crosby & Co., Farnham	5,680 0 0
Norman Buckley, Guernsey	5,616 11 3
A. G. Osenton, Reading	5,577 13 0
Hardy & Co., Woking	5,500 0 0
G. Riley, Welwyn	5,446 16 11
G. Bell & Sons, Ltd., Tottenham	5,441 1 9
Davidson & Sykes, Westminster	5,396 15 6
J. Douglas, Southampton	4,897 0 0
W. J. Harris, Basingstoke	4,835 16 11
P. Cooper, Midhurst	4,670 12 2
*H. C. Pullar & Co., Manchester	4,449 16 7

BARNSLEY.—For painting schools, &c., for the T.C. :—

*Barnsley British Co-operative Society—Three schools	£309 5
*T. L. Stephenson & Son—Three schools	234 0
*J. Snowden & Son—One school	194 10

BEDFORDSHIRE.—For erection of bungalows at Lidlington, Oakley, and Bedford. Mr. W. B. Stonebridge, architect, Bedford :—

Lidlington, for Mr. Ireson Roberts—

*J. Bettle, Cranfield	£450 0

Oakley, for Miss M. McBeath—

National Building Guild	841 10
S. Nicholls	785 0
W. Poole	750 0

Bedford, for Mr. W. Farmer—

C. A. White	1,036 0
S. Foster	1,035 0
National Building Guild	1,021 0
T. Bowler	968 0
Corby & Son	950 0
C. Negus	870 0
W. Laughton	870 0
W. Litchfield & Son	859 0
Warton & Goodship	839 0
Jacobs & Burton	839 0
W. Keech	746 10
*J. T. Lovell & Son	740 0

BIDFORD-ON-AVON.—For erection of 18 non-parlour houses on Tower Hill site, for the Alcester R.D.C. Mr. H. E. Dicks, architect, 1, Market-place, Evesham :—

	With tile roof.	With slate roof.
W. J. Gregory & Son, Colwyn Bay	£12,555 0 0	£12,247 0 0
Tilt Bros., Bromsgrove	9,168 0 0	8,271 0 0
J. G. Fincher & Co., Stratford	8,555 10 0	8,257 10 0
Roberts (Birmingham), Ltd., Birmingham	8,250 0 0	7,320 0 0
C. G. Huins & Sons, Redditch	8,130 0 0	7,950 0 0
J. Taylor & Sons, Evesham	7,779 10 0	7,468 0 0
H. M. Grant & Co., Birmingham	7,776 0 0	7,488 0 0
E. L. Lewis, Redditch	7,544 0 0	7,364 0 0
F. G. Bursill, Leamington	7,382 10 0	6,732 10 0
Harrison Bros., Redditch	7,290 0 0	6,912 2 0
B. Whitehouse & Sons, Birmingham	7,421 0 0	6,881 0 0
Unit Construction Co., Birmingham	7,244 3 8	6,570 15 6
Cockerell & Jelfs, Badsey	7,205 15 0	7,066 15 0
S. E. Moss, Southend-on-Sea	7,150 0 0	7,150 0 0
F. H. Smith, Birmingham	7,100 0 0	6,890 0 0
J. H. Smith, Kidderminster	7,030 0 0	6,820 0 0
John Bryan, Bidford	7,013 17 10	6,869 17 10
James Barber, Kenilworth	6,975 0 0	6,615 0 0
John Lees, Kenilworth	6,910 0 0	6,615 0 0
H. & J. Smith, Bidford	6,660 0 0	6,480 0 0
†Alcester Builders, Ltd. Alcester	6,480 4 6	6,234 14 0
E. Clark, Melton Mowbray	6,446 0 0	6,266 0 0

BIRMINGHAM.—Erection of school building at Shenley Homes, for the B.G. :—

*Maddocks & Walford	£4,599

BIRMINGHAM.—Extension of swimming bath at Erdington Homes, for the B.G. :—

*H. H. Crump, Edgbaston	£600

BOLTON-ON-DEARNE.—For excavating, drainage and making-up certain back roads. Mr. W. H. Adams, Council Offices, Bolton-on-Dearne :—

E. E. Dickinson, Bolton-on-Dearne	£487 11 0
Hadfield & Sons, Ltd., Sheffield	397 14 10
C. Sparkes & Sons, Doncaster	377 16 0
S. Porter & Sons, Doncaster	353 10 3
*H. C. Pullan & Co., Manchester	323 0 0

BURTON-ON-TRENT.—Erection of electricity substation in High-street, for the T.C. :—

*Kershaw & Sons	£260

COLCHESTER.—For repair and extension of porter's lodge, for the B.G. The Clerk to the Guardians, Colchester :—

A. J. Diss, Colchester	£590 0
— Wilson, Colchester	575 0
Chambers & Son, Colchester	554 0
— Beaumont, Lexden	546 0
The National Building Guild, Colchester	495 0
*W. J. Vaughan, Colchester	390 10

COLCHESTER.—For supplying and fixing heating apparatus for Board Room and adjacent rooms, for the B.G. The Clerk of the Guardians, Colchester :—

Llewellyn & Co., Clacton—£260, less £41 allowance for old pipes.
Beard & Co., Colchester—£197 11s. 6d., less £8.
Joslin, Ltd., Colchester—£184, less £16.

CONISBOROUGH.—For (*a*) alterations to Council Offices, (*b*) installation of hot-water heating of offices, (*c*) wiring for electric light, for the Council. Mr. H. Thirlwall, Surveyor, Council Offices, Conisborough :—

(*a*) Alterations to Council Offices—

C. Sprakes & Sons, Doncaster	£709 19 6
Don Builders, Ltd., Doncaster	656 10 0
C. E. Cross, Rotherham	649 0 0
T. Jenkinson & Sons, Doncaster	595 10 7
Flowitt & Gilbert, Doncaster	570 6 4
H. Cooper, Maltby	570 0 0
E. Morley & Sons, Derby	560 10 0
J. Done & Son, Doncaster	540 0 0
*Mullins & Co., Doncaster	499 0 0

(*b*) Heating of Offices—

Tyler & Freeman, London	£137 0 0
E. Morley & Sons, Derby	124 13 6
A. Grindrod & Co., Sheffield	112 3 10
Brightside Foundry Co., Sheffield	99 12 6
C. E. Cross, Rotherham	98 0 0
Newton Chambers, Ltd., Thorncliff	95 10 0
H. Thrush & Co., Doncaster	95 0 0
A. Higginbottom & Sons, Idle	90 0 0
*C. Sprakes & Sons, Doncaster	74 11 10

(*c*) Electric Lighting of Offices—

Ellis & Ward, London	£165 0 0
Tyler & Freeman, London	106 0 0
E. Morley & Sons, Derby	77 17 0
Creswick & Dixon, Sheffield	76 0 0
R. Ketley, Doncaster	74 10 0
E. F. Brett, Doncaster	73 0 0
Inman Bros., Sheffield	73 0 0
Woodhead Bros., Rotherham	72 0 0
Hall & Stinson, Ltd., Sheffield	70 0 0
A. Higginbottom & Sons, Idle	69 12 6
Dewhurst Engineering Co., Sheffield	69 0 0
W. Skewes & Co., Doncaster	68 17 10
Marsh Bros., Sheffield	67 10 6
R. B. Isle, Doncaster	64 19 0
*Edward Moore, Doncaster	57 18 6

CONISBOROUGH.—For erection of a public convenience at Denaby Main for the Council. Mr. H. Thirlwall, Surveyor, Council Offices, Conisborough :—

C. E. Cross, Rotherham	£399 0
T. Jenkinson & Sons, Doncaster	376 1
E. Morley & Sons, Derby	374 8
J. Done & Son, Doncaster	360 0
H. Cooper, Maltby	348 0
Mullins & Co., Doncaster	347 0
Flowitt & Gilbert, Doncaster	323 19
*Don Builders, Ltd., Doncaster	290 0

ELM (NEAR WISBECH).—For erection of a bungalow in Kirkham-lane, for Mr. J. R. Sturdy. Mr. J. W. Crouch, architect and surveyor, Post Office-lane, Wisbech. Quantities by architect :—

T. J. Jupp, Wisbech	£650 0
J. G. Hood, Wisbech	622 0
Rands & Son, Ltd., Wisbech	590 0
Elworthy & Co., Upwell	579 0
F. W. Groom, Wisbech	575 0
Tann & Gibson, Wisbech	565 0
White & Holmes, Elm	560 15
Webber & King, Upwell	560 0
Hill & Jenkinson, Elm	544 2
J. T. Shepherd, Outwell	540 0
*W. Shepperson, Elm	494 15

GLASGOW.—For reglazing of roofs at Kelvingrove Art Galleries, for the T.C. :—

*Helliwell & Co.	£731 4 3

H.M. OFFICE OF WORKS (Accepted during August).—*Building Works, &c.* : Ashton-under-Lyne Post Office—Extension : Edwin Marshall & Sons, Ltd., Ashton-under-Lyne. Painting : P. M. Mellor, Ashton-under-Lyne. Plastering : A. Jeffreys, Dukinfield. Plumbing : R. Butterworth, Ashton-under-Lyne. Cricklewood Chart Factory—Erection : Chessums, Ltd., London, N. Newcastle Employment Exchange—Erection : The National Building Guild, Ltd., Newcastle-on-Tyne. New Science Museum—Stonework : The Nine Elms Stone Masonry Works, London, S.W. St. James's Park—Refreshment Kiosk : T. W. Heath, Ltd., London, S.W.—*Engineering Services* : Manchester District—Engineering Labour : Maitland & Co., Manchester. Natural History Museum—Electric Wiring : The Alpha Manufacturing Co., London, S.W.—*Painting* : Dilliway & Elvy, London, W. ; J. S. Fenn, Woolwich ; M. Greenwood & Son (Burnley), Ltd., London, N.W. ; T. W. Heath, Ltd., London, S.W. ; Trollope & Colls, Ltd., London, S.W. ; John Williams (Liverpool), Ltd., Liverpool.—*Miscellaneous* : Cisterns : Dodd & Oulton, Ltd., Liverpool. Coal Cartage : Toser & Sons, London, N.W. ; H. Boyer, London, W. ; Phillips, Mills & Co., Ltd., London, S.W. Filing Cabinets : Waring & Gillow, Ltd., London, W. Fireproof Floors : The Kleine Patent F.R. Flooring Syndicate, Ltd., London, W.C. Joinery : H. Gibbons & Son, Ltd., Cardiff. Plastering : Jefferyes & Co., London, W. ; Clark & Fenn, London, S.E. Slating : Wylie Bros., South Shields ; Digby, Nelson & Sons, Ltd., Sunderland ; Bingley, Son & Follett, London, S.W. Steel Sashes : Maclean & Co., London, S.W. Wood Block Flooring : A. M. Macdougall & Son, Glasgow.

HOVE.—For making up roadway, forming footway, &c. Mr. H. H. Scott, Borough Surveyor, Town Hall, Hove :—

*J. Parsons & Sons, Hove	£307

HUDDERSFIELD.—For erection of a bakehouse and garage at Birkby. Messrs. Lunn & Kaye, architects and surveyors, Milnsbridge, Huddersfield. Quantities by architects :—

Masons', Bricklayers' and Concreter's work—

*Abm. Graham & Sons, Huddersfield.	

Joiner's work—

*J. Hinchliffe, Milnsbridge, Huddersfield.	

Plumber's and Electrician's work—

*J. H. Taylor & Co., Huddersfield.	

Roof Tiler's and Plasterer's work—

*W. E. Jowitt, Huddersfield.	

Painter's work—

*Lunn & Cardno, Huddersfield.	

KIRKCALDY.—For construction of foundations for plant at electricity works, for the T.C. :—

G. Smith & Son, Kirkcaldy	£1,637 16 6

LANGFORD, BEDS.—For the erection of farm buildings for Mr. William Wells, Kingsley Farm. Mr. Thomas Cockrill, architect, 7, St. Paul's-square, Bedford, and Market Chambers, Biggleswade :—

Geo. Wrycroft & Sons, St. Neots	£1,149
J. Corby & Son, Bedford	1,100
F. Newton, Hitchin	1,098
S. Redhouse & Son, Stotfold	1,089
*C. Wright & Son, Langford	1,030

LICHFIELD.—For laying sewer in Castle-street for the R.D.C. :—

*E. E. Jevons, Dudley Port	£229 16 5

LONDON.—For repairs and redecorations to Male Infirmary Block at St. John-road Institution, for the Guardians of the Poor of the Parish of St. Mary, Islington. Mr. Edmund J. Harrison, architect, 23, Berkeley-road, N.8. :—

F. Cousins, Holloway	£1,057
W. Green & Sons, Upper Holloway	969
A. J. King, Islington	795
R. Young Construction Co., Canonbury	730
A. C. Mackinlay, Upper Holloway	717
Arding & Hobbs, Lavender Hill	703
Chappell & Co., Pancras-lane	689
Fielder & Mills, Islington	687
J. C. Mather, Canonbury	682
Stevens & Sons, Highgate	633
A. R. Willats, Holborn	628
The Unity Builders, Talford-road	600
Perry Bros., Whitecross-street	587
J. A. Hunt (Builders), Ltd., Highgate	560
West & Brooks, Walthamstow	520
*Haslam & Sons Woolwich	372

LONDON.—For repairs and redecorations to Medical Superintendent's residence at Islington Infirmary, for the Guardians of the Poor of the Parish of St. Mary, Islington. Mr. Edmund J. Harrison, architect, 23, Berkeley-road, N. 8:—

Fielder & Mills, Islington	£299 0 0
W. Green & Sons, Upper Holloway	289 0 0
J. E. Billings & Co., Ltd., Hendon	244 0 0
F. Cousins, Holloway	241 0 0
A. C. Mackinlay, Holloway	237 12 6
Dilliway & Elvy, West Kensington	223 0 0
J. C. Mather, Islington	221 0 0
Chappell & Co., Pancras-lane	199 0 0
R. Young Construction Co., Canonbury	198 0 0
Perry Bros., London	197 0 0
The Unity Builders, London	185 10 0
A. Cuthbert, Brixton-hill	182 0 0
Stevens & Sons, Highgate	177 0 0
J. Johnson, Canonbury	176 0 0
A. J. King, Ltd., Islington	175 0 0
J. J. Powers, Tottenham	160 0 0
A. R. Millats, Holborn	158 0 0
S. Brown & Sons, Lower Edmonton	154 0 0
S. T. Wright, Clapham Junction	150 0 0
R. Haslam & Sons, Woolwich	138 5 0
J. A. Hunt (Bldrs.), Ltd., Highgate	130 0 0
West & Brooks, Walthamstow	129 0 0
*Arding & Hobbs, Lavender-hill	96 0 0

LONDON.—Supply of Portland cement to the Bethnal Green B.C., for three months :—

*Wakeley Bros., & Co.	At 63s. per ton, less 2½ per cent.

LONDON.—For (*a*) paving Swaby-road, Springfield, on Magdalen Park Estate; and (*b*) paving Topsham-road, Balham, on Elmwood House Estate, for the Wandsworth B.C. :—

*G. Wimpey & Co. .... (*a*) £5,099 and (*b*) £6,199

LONDON.—For paving of Brudenell-road, Balham, for the Wandsworth B.C. :—

*G. Wimpey & Co. £5,353

LONDON.—For repairs and redecorations to Operating Theatre, Islington Infirmary, for the Guardians of the Poor of the Parish of St. Mary, Islington. Mr. Edmund J. Harrison, architect, 23, Berkeley-road, N. 8 :—

A. C. Mackinlay, Upper Holloway..	£197 10
Yeoman & Richardson, Hornsey-road	162 10
Dilliway & Elvy, Kensington.....	147 3
Stevens & Sons, Highgate.....	142 0
The Unity Builders, London.....	142 0
J. E. Billings & Co., Ltd., Hendon ..	123 0
J. C. Mather, Islington.....	118 0
J. J. Powers, Tottenham.....	112 0
J. Johnson, Canonbury.....	112 0
Perry Bros., London.....	105 0
Arding & Hobbs, Lavender-hill....	103 0
F. Cousins, Holloway.....	99 0
A. Cuthbert, Brixton-hill.....	95 0
*S. Brown & Sons, Lower Edmonton	90 0

SCOTFORTH.—For erection of a bungalow. Mr. R. W. Jackson, architect and surveyor, 43, Church-street, Lancaster :—

Bricklayer—
R. L. Dilworth, Lancaster £261 4 2

Joiners—
W. & I. Peill, Lancaster..... 173 0 0

Slater—
Hargreaves & Watkinson, Lancaster 132 5 11

Plumber—
Abbot, Lancaster 72 5 6

WHITCHURCH.—For construction of about 530 yards of 12 in. and 9 in. earthenware pipe surface water sewers, with manholes, &c., at Church-road, for the Llandaff and Dinas Powis R.D.C. Mr. William Farrow, engineer and surveyor, 20, Park-place, Cardiff :—

R. E. J. Haines, Cardiff.....	£1,040 0 0
Barnes, Chaplin & Co., Ltd., Cardiff	994 13 11
Andrew Lowrie, Whitchurch ..	980 18 3
C. V. Buchan & Co., Ltd., Brighton	944 17 2
Dawkins, Harris & Weaver, Ltd., Chepstow	939 13 5
Johnson & Langley, Ltd., Newport	925 6 4
N. Moss, Merthyr Tydfil	822 2 7
John Harry, Radyr	807 5 3
Edwin Williams & Son, Whitchurch	787 18 6
F. C. Williams, Cardiff	775 11 0
William E. Lewis, Dinas Powis..	739 12 6
Maberley Parker, Jnr., Cardiff	690 13 7
Edgar Evans & Co., Ltd., Llandaff	670 11 5
Thomas Rossiter, Caerphilly....	630 3 2
*Lewis & Pritchard, Ltd., Dinas Powis	578 16 6

WILLESDEN.—For cleaning and painting at Municipal Hospital, for the U.D.C. :—

*A. E. Hatton, Kilburn..... £781 17 6

WISBECH.—Repair of chimney shaft at pumping station, for the Main Sewerage Board :—

*H. Tann £103

Sudan Irrigation.

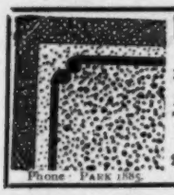
A contract for new irrigation works in the Sudan, the amount of which is approximately £4,000,000, has been secured by Messrs. S. Pearson & Son. The scheme includes the building of a dam across the Blue Nile, extending nearly two miles in length, and also some 650 miles of canal and drainage. The scheme, when complete, will irrigate between three and four thousand acres of land, which are to be laid out as cotton gardens.

Institution of Sanitary Engineers.

The opening sessional meeting in connection with the Institution of Sanitary Engineers will be held at Caxton Hall, Caxton-street, Westminster, S.W.1, on Wednesday, October 4. The proceedings will commence with a reception at 7.30.

Wages on Public Works.

The Public Works Conciliation Board has decided that the rates of wages in the London area shall be as follows for the three months October, November, and December :—Labourer, 1s. 4d.; blacksmith, 1s. 8½d.; concrete leveller, 1s. 4d.; duct or earthenware drain layer, 1s. 5d.; fitter, 1s. 8½d.; granite mason (Kent, &c.), 1s. 9½d.; granite sett dresser, 1s. 8½d.; jointer, 1s. 5d.; kerb-fixer, 1s. 8½d.; pavior, 1s. 8½d.; petrol locomotive or roller driver, 1s. 6d.; platelayer, 1s. 5d. to 1s. 6d.; platelayer's labourer, 1s. 4d.; pneumatic pick operator, 1s. 5d.; rammerman, 1s. 5d.; scaffolder, 1s. 7d.; screeder, 1s. 5d.; steam-roller driver, 1s. 8d.; street mason and flag dresser, 1s. 8½d.; tarpot man, 1s. 4d.; timberman, 1s. 5d.; wood-block layer, 1s. 5d.; watchman, 7s. 6d. minimum day or night. The hours of labour and overtime rates remain as agreed on March 11, 1920.


TERRAZZO & MOSAIC PAVINGS
PARQUET & WOOD BLOCK FLOORINGS.
Post or 'phone details of requirements to
TURPIN'S PARQUET FLOORING CO.,
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